



Operating Instructions

Translation of original operating instructions

Installation Machine

VM-301-PAVERMAX / VM-301-K-PAVERMAX (Joystick JMS)



Bitte beachten Sie, dass das Produkt ohne vorliegende Betriebsanleitung in Landessprache nicht eingesetzt / in Betrieb gesetzt werden darf. Sollten Sie mit der Lieferung des Produkts keine Betriebsanleitung in Ihrer Landessprache erhalten haben, kontaktieren Sie uns bitte. In Länder der EU / EFTA senden wir Ihnen diese kostenlos nach. Für Länder außerhalb der EU / EFTA erstellen wir Ihnen gerne ein Angebot für eine Betriebsanleitung in Landessprache, falls die Übersetzung nicht durch den Händler/Importeur organisiert werden kann.

Please note that the product may not be used / put into operation without these operating instructions in the national language. If you did not receive operating instructions in your national language with the delivery of the product, please contact us. In countries of the EU / EFTA we will send them to you free of charge. For countries outside the EU / EFTA, we will be pleased to provide you with an offer for an operating manual in the national language if the translation cannot be organised by the dealer/importer.

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1 EC-Declaration of Conformity

EC-Declaration of conformity

Description: Installation Machine
Type: VM-301-PAVERMAX / VM-301-K-PAVERMAX
(Joystick JMS)
Order-Nr.: 5150.0022+5150.0023 (41500820)
Manufacturer: Probst GmbH
Gottlieb-Daimler-Straße 6
71729 Erdmannhausen, Germany
info@probst-handling.de www.probst-handling.de



The machine described above complies with the relevant requirements of the following EU directives:

EC-machinery directive 2006/42/EG

2014/30/EU (Electromagnetic compatibility)

The following standards and technical specifications were used in extracts:

DIN EN ISO 12100

Safety of machinery - General principles for design - Risk assessment and risk reduction (ISO 12100:2010)

DIN EN ISO 13857

Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs (ISO 13857:2008)

DIN EN 60204-1 (IEC 60204-1)

Safety of machinery, electrical equipment of industrial machines. Part 1: General requirements

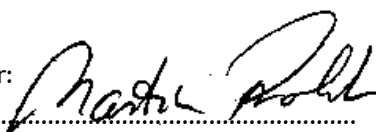
Authorized person for EC-documentation:

Name: J. Holderied
Address: Probst GmbH; Gottlieb-Daimler-Str. 6; 71729 Erdmannhausen, Germany

Signature, informations to the subscriber:

Erdmannhausen, 25.06.2018.....

(M. Probst, Managing director)

A handwritten signature in black ink, appearing to read "M. Probst", written over a dotted line.

EC-Declaration of Conformity / UKCA-Declaration of Conformity

Manufacturer: Probst GmbH
Gottlieb-Daimler-Straße 6
71729 Erdmannhausen, Germany
info@probst-handling.de
www.probst-handling.com



Importer: Probst Ltd
Unit 2 Fletcher House
Stafford Park 17
Telford Shropshire TF3 3DG, United Kingdom
www.probst-handling.co.uk
sales@probst-handling.co.uk



The machine described above complies with the relevant requirements of the following EU directives:
The object of the declaration described above is in conformity with the relevant UK-Regulations and UK-Guidelines:

EC-machinery directive 2006/42/EC (Reference: OJ L 157, 09.06.2006)

UK-Regulation: Supply of Machinery (Safety) Regulations 2008 (SI 2008 No. 1597)

2014/30/EU (Electromagnetic compatibility) / (Reference: OJ L 96, 29.03.2014)

UK-Regulation: Electromagnetic Compatibility Regulations 2016 (SI 2016 No. 1091)

The following standards and technical specifications were used:

DIN EN ISO 12100

Safety of machinery - General principles for design - Risk assessment and risk reduction

UK-Regulation: BS EN ISO 12100-1:2003+A1:2009

DIN EN ISO 13857

Safety of machinery - safety distances to prevent hazard zones being reached by upper and lower limbs.

UK-Regulation: BS EN ISO 13857:2019

2014/30/EU (Electromagnetic compatibility) / (Reference: OJ L 96, 29.03.2014)

UK-Regulation: Electromagnetic Compatibility Regulations 2016 (SI 2016 No. 1091)

DIN EN 60204-1 (IEC 60204-1)

Safety of machinery, electrical equipment of industrial machines. Part 1: General requirements.

UK-Regulation: BS EN 60204-1:2018

Authorized person for EC-documentation:

Name: Jean Holderied

Address: Probst GmbH; Gottlieb-Daimler-Straße 6; 71729 Erdmannhausen, Germany

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Name: Nigel Hughes

Address: Probst Ltd ; Unit 2 Fletcher House; Stafford Park 17; Telford Shropshire TF3 3DG, United Kingdom

Signature, information to the subscriber:



Erdmannhausen, 02.08.2021.....

(Eric Wilhelm, Managing director)

2 Safety

2.1 Safety symbols

**Danger to life!**

Identifies imminent hazard. If you do not avoid the hazard, death or severe injury will result.

**Hazardous situation!**

Identifies a potentially hazardous situation. If you do not avoid the situation, injury or damage to property can result.

**Prohibition!**

Identifies imminent a prohibition. If you do not avoid the prohibition, death and severe injury, or damage to property will result.



Important information or useful tips for use.









2.2 Definition skilled worker / specialist







Only skilled workers or specialists is it allowed to carry out the installation,- maintenance, - and repair work on these device!

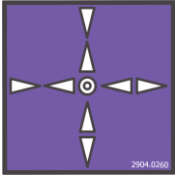


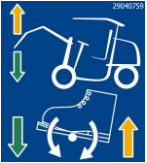
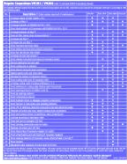



Skilled workers or specialists must have for the following points (if it applies for these device), the necessary professional knowledge.





- for mechanic
- for hydraulics
- for pneumatics
- for electrics

2.3 Safety Marking

WARNING SIGN			
Symbol	Meaning	Order-No.	Size [mm]
	Any staying under suspended device with and without load is strictly forbidden. Danger to life!	2904.0210 2904.0209 2904.0204	Ø 30 Ø 50 Ø 80
	Prohibition! Do not open while the engine is running.	2904.0259	70x115
	Attention! – Pull hand brake in idle machine time. To drive release handbrake.	2904.0267	45x80
	Max. 650 kg (1,430 lbs) → VM-301-K Maximum weight paver load 380 kg (840 lbs) (837,8 lbs) with counterbalance 440 kg (970 lbs)	2904.0623	40x160
	Max. 600 kg (1,320 lbs) → VM-301 Maximum weight paver load 320 kg (710 lbs) with counterbalance 380 kg (840 lbs)	2904.0616	40x160
	Warning – Warming up time with half throttle before doing any driving: Temperature more than 10° C: 5 Min. Temperature less than 10° C: 10 Min	2904.0243	150x55
	Fill-in only diesel – NO bio-diesel!	2904.0483	16x130
	It is forbidden to ride on the installation machine.	2904.0762	Ø 50

WARNING SIGN			
Symbol	Meaning	Order-No.	Size [mm]
	Danger of squeezing the hands.	2904.0221 2904.0220 2904.0107	30 50 80
	Danger: Injury of hands and fingers – belt drive	2904.0451	48x54
	Warning for hot surfaces	2904.0396	31x27
	Warning for electric voltage	2904.0397	31x27
	Warning for battery acid.	2904.0551	30
	Danger: Keep distance to the machine.	2904.0756	64x103

REGULATORY SIGN			
Symbol	Meaning	Order-No.	Size [mm]
	Directions of the joystick movements for the control the a hydraulic installation clamp (HVZ) or the like (opening and closing of gripping directions).	2904.0253	50x50
	Joystick with function controls as well as activations of additional functions or similar. <u>Function controls: for controlling of a hydraulic installation clamp (HVZ) or similar.</u> <u>Additional finctions:</u> - Rotating movement of a hydraulic rotator - Vacuum operation (suction and release of load)	2904.0681	70x72
	Driving direction forwards / backwards + correct operation of the pedals	2904.0760	68x43
	Lifting arm up / down	2904.0759	48x43
	Short-manual	2904.0614	180x165
	Regular Inspections	2904.0611	235x180
	Each operator must have read and understood the operating instructions (and all safety instructions).	2904.0665 2904.0666	Ø 30 Ø 50
	Seat belt duty On every drive with the machine the seat belt is to be applied.	2904.0450	Ø 52

INFORMATION SIGNS			
Symbol	Meaning	Order-No.	Size [mm]
	Engine speed regulation	2904.0485	30x90
	Open engine cover	2904.0253	28x85
	Button for horn / reset button: Press reset button for driving, when the driving was stopped caused by the standing up of the operator from the driver's seat (triggered by the safety seat switch). The reset button only works, when the operator is sitting on the driver's seat.	2904.0716	90x23
	Position of the lashing eyes	2904.0755	Ø 60

2.4 Personal safety requirements



- Each operator must have read and understood the operating instructions (and all safety instructions).
- Only qualified, authorized personal is allowed to operate the device and all devices which are connected (lifting equipment).
- The manual guiding is only allowed for machines with handles.

2.1 Protective equipment

The protective equipment must consist, according to the safety regulations of the following parts:

- Protective clothing
- Safety gloves
- Safety shoes

2.2 Accident prevention



- The workplace has to be covered for unauthorized persons, especially children.
- Take care in case of thunderstorm!



- The workplace has to be sufficiently illuminated.
- Take care with handling wet, dirty and not solidified components.



- The working with the device in case of atmospheric editions under 3° C (37,5° F) is forbidden! Because the goods could be fall down caused by dampness or freezing.

2.3 Function Control

2.3.1 General



- Before using the device check the functions and the working condition.
- Maintenance and lubrication are only permitted when device is shut down!



- Do not use the device, until all faults which can cause safety hazards are removed.
- If there are any cracks, splits or damaged parts on any parts of the device, **immediately** stop using it.



- The operating instructions must be available at the workplace every time.
- Do not remove the data-plates of the machine.
- Unrecognisable information signs must be replaced.

2.3.2 Hydraulic



- Check all hydraulic hoses and connection for tightness. Only experts are allowed to replace faulty parts (depressurized)



- Ensure a clean working environment before opening the hydraulic connection.



- The hydraulic hoses must be free of breaks and abrasion. Take care that there are no outstanding edges, where the hoses could hook in.

2.4 Safety procedures

2.4.1 Installation machine

- The installation machine has to be in good, safe working condition.
- **Never exceed the maximum capacity of the installation machine!**
- Only authorized and qualified personnel are allowed to operate the installation machine.
- The operator staff must have all the necessary qualifications.

2.4.2 Safety procedures using the VM-301-PAVERMAX



- The load has to be lowered down to approximately 20 cm above ground during driving actions.
- The max. **carrying capacity** with the laying machine VM-301-PAVERMAX , the attachments and the lifted loads **must not be exceeded!**
- The driver has to pull the hand break before leaving the driver's seat.
- During operation of the machine the driver is responsible for the safe condition of the machine.
- Driving around curves or on uneven ground max. speed must not exceed 7 km/h which is 1/3 of the max. speed of the machine.
- No driving speed faster than walking speed when the machine is tilted sideways more than 20°.



- Driving actions of the machine without any lifting device attached not quicker than walking speed, danger to tip over.
- When working on uneven ground always be beware of sufficient standing security.
- Never fill fuel into the tank while the engine is running. Danger of explosion.
- Never use starter spray, in winter always use winter gasoline.
- **When working on the electric system always detach the battery.**



- Never open the motor hood while the engine is running. Always keep the motor hood closed to avoid injury and to limit noise emission.
- During the laying work personal is not allowed to be in the driving and working area generally, it is forbidden to stand underneath suspended load.
- **The driver must not leave the driver's seat as long as load is suspended by the lifting device and the engine is running.**
- Never let the cross-stick or the pedals flip back to the neutral position to avoid hydraulic pressure shocks. These pressure shocks could damage the components or release the suspended load.

3 General

3.1 Authorized use

- The installation machine VM-301-PAVERMAX can only be used in the following way:
To lay concrete pavers with an Hydraulic Installation Clamp HVZ. To lay kerb stones by using the Kerb Stone Laying Clamp VZ-HS. To sweep sand into the joints by using the Sweeping Broom EB 240. To lay elements by using the Hydraulic Vacuum Units HVE or VPM.
 - Exclusively lifting equipment from Probst can be operated with the VM-301-PAVERMAX. Before using any lifting equipment always call Probst for approval.
 - The installation machine VM-301-PAVERMAX is no crane equipment!
 - All instructions, included in the manuals to the machine, have to be observed.
-
- Optional mounting kits for hydraulic activated vacuum devices at VM-301-K/VM-301:
 - PJ-1650-H / mounting kit (Order.-Nr.: 41500755)
 - SH-1000-MINI-H / mounting kit (Order.-Nr.: 41500756)
 - VPM-2500-H / mounting kit (Order.-Nr.: 41500754)
 - SH-1000-SUPER-JET-H / mounting kit (Order.-Nr.: 41500753)



Life danger!

The use is strictly forbidden inside closed buildings or in other explosion or fire sensitive areas due to the use of the gasoline engine.



It is not allowed to use the paver laying machine in public traffic – only construction sites or private ground!



- The machine is only designed for the use specified in this documentation.
- Every other use is not authorized and is forbidden!
- **The using of the device for persons under the age of 16 is forbidden!**
- All relevant safety regulations, especially regulations of the declaration of conformity, and additional local health and safety regulations have to be observed.



Prior to every operation the user must ensure that:

- the machine is suited to the intended operation,
- the functioning and the working condition of the equipment is examined,
- the loads are suitable to be handled.

Any doubts about instructions should be raised with the manufacturer prior to use.



NOT ALLOWED ACTIVITIES:

Unauthorized alterations of the device and the use of any self-made additional equipment could cause danger and are therefore **forbidden!!**

Never exceed the **carrying capacity** and the **nominal width/gripping range** of the device.

All unauthorized transportations with the device are not allowed:

- Transportation of people and animals.
- Never suspend any goods with ropes, chains or similar at the device.

3.1.1 Optional accessoires

Type	Description	Best.-Nr
Cabin	Retrofit kit for VM-301 W/glazing and heating (Retrofit only possible at Probst company)	4150.0690
Light package VM-301	2 combi-headlights (near/far), 1 reversing light	4150.0738
Light package VM-301-K	2 combi-headlights (near/far), 1 reversing light	4150.0692
Turning Light	With swing down foot incl. installation material	4150.0737
Exterior mirror	Retrofit kit	4150.0358
Mounting bracket	For light package and/or exterior rear-view mirrors (is only required once)	4150.0739
Extra weight	To increase the working load limit by 60 kg*	4150.0357
Diesel particle filter DPF	Retrofit kit for VM-301-K, VM-301 and VM-203	4150.0784
Filter Cartridge	for Diesel particle filter DPF	2690.0034
Windscreen washer	Without adjustable wiping interval. Retrofit kit for VM-301-K	4150.0788
Adapter QJ for Rotator Bini/Baltrotor		4011.0319
VM-301- JMS-V	Electronic joystick and armrest incl. installation kit. To control the main gripping width, side gripping width, rotator and incl. vacuum function. (Retrofitting possible only at Probst) Incl. installation.	4150.0820

* At adequate driving speed and lowered load. Max. weight of paver layer as per technical data.

3.2 Survey and construction



3.3 Technical data

Enginepower				18,7 kW / 25 hp			
Equivalent noisepollution LpA:				79 dB			
Vibrations:		Effective value of acceleration for the upper limbs:			< 2,5 m/s²		
		Effective value of acceleration for the body:			< 0,5 m/s²		
Steering				Double articulated steering			
Velocity adjustment				Hydrostat-continuously variable			
Maximum speed:				approx. 20 km/h (15 m/ph)			
Dimensions and weight							
Height / Width / Length:				1,980 mm (78") / 1,220 mm (48")/ 3,610 mm (142")			
Dead weight:				1,080 kg (2,380 lbs) ** kg			
				1,200 kg (2,650 lbs) ***			
Carrying capacity				600 kg (1,320 lbs) */** and 650 kg (1,430 lbs) */***			
Maximum weight of stone formation				320 kg (710 lbs) */**			
				380 kg (840 lbs)			
Max. lifting height:				1,600 mm (63")			
Turning radius inner front wheel / outer front wheel				700 mm (27") / 1,900 mm (75")			
Turning radius overall:				2,450 mm (69")			
Ground clearance:				180 mm (7")			
Filling capacity:	Fuel tank	20 l					
	Motor oil SAE10W40	4,3 l	below 0°C:SAE10W, 0°-25°C:SAE20, over 25°C:SAE30				
	Hydraulic oil	18 l	HLP 46				
Kubota Diesel motor D 1105		Technical data see: Kubota Diesel motor D 1105					
Seat:	Height adjustable, , adjustable backrest, adjustable spring power						
* At adequate driving speed and lowered load.							
** VM-301-PAVERMAX							
*** VM-301-K-PAVERMAX							

4 Description and Operation

In conditional of the outdoor temperature it is absolute necessary to keep the warm up times at every daily use (before the first motion of travelling) of the installation machine VM-301-PAVERMAX .

outdoor temperature over
10°C(50 F):
5 minutes

outdoor temperature
under 10°C(14 F):
10 minutes

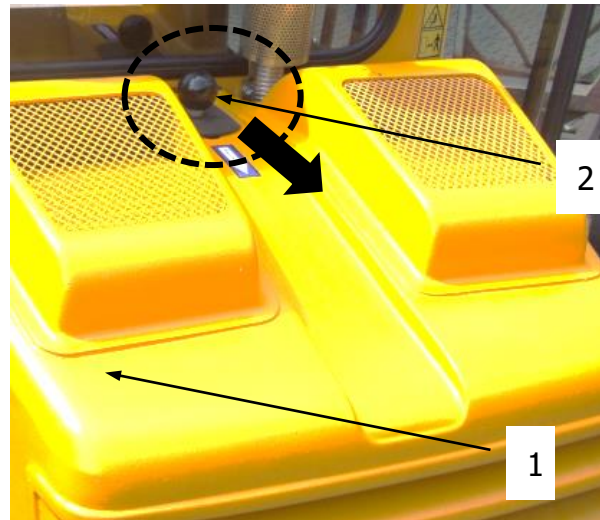
Before using the installation machine VM-301-PAVERMAX account the safety instructions and carry out the maintenance work.

For a safety and trouble-free operation of the installation machine VM-301-PAVERMAX is it necessary to carry out the following the daily checks:

4.1 Daily checks

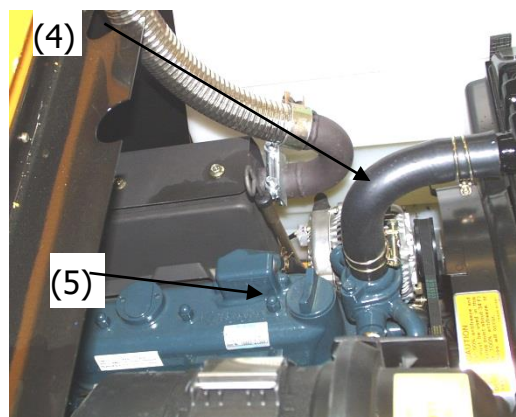
4.1.1 Fuel level

- Open the lock of the engine cover (1), open engine cover by pulling the handle (2) and tip the engine cover backwards.
- You can check the fuel level visually, because the tank is transparent.
- With a full tank you can work approx. 10-12 hours.



4.1.2 Motor-oil level

- Installation machine VM-301-PAVERMAX has to stand on even, levelled ground.
- Open the lock of the engine cover, open engine cover by using handle and tip the engine cover backwards.
- Pull the oil dip stick (4) out
- Oil level has to be between the two marks
- If oil is missing fill oil into the oil filler (5).
- If there is too much oil drain the oil out through the oil drain screw on the bottom of the engine



4.1.3 Hydraulic-oil level

- The installation machine VM-301-PAVERMAX has to stand on even and levelled ground to check the hydraulic oil.
- The lifting arm has to be completely lowered down.
- The oil level must be in the middle of the inspection windows (6).



4.1.4 Cooling-water level

- The installation machine VM-301-PAVERMAX has to be on even levelled ground
- Open the engine cover as described above
- Remove cover(7) on the water cooler (Caution when engine is hot)
- Cooling water has to cover cooling fins. If not fill only anti freeze to reach this level.

By all means read the safety instructions in the Kubota engine manual carefully.

Air filter



Hydraulic oil filter

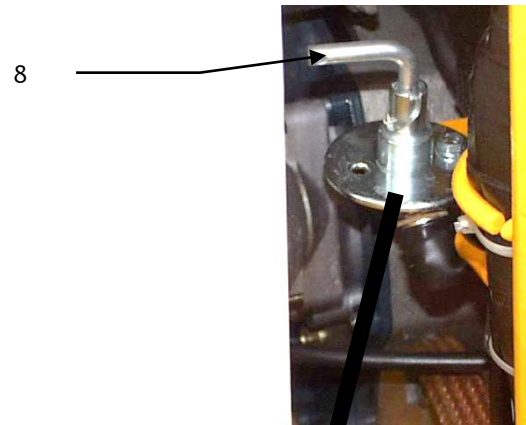


Fuel pump
preliminarv

Fuel pump

4.1.5 Main switch

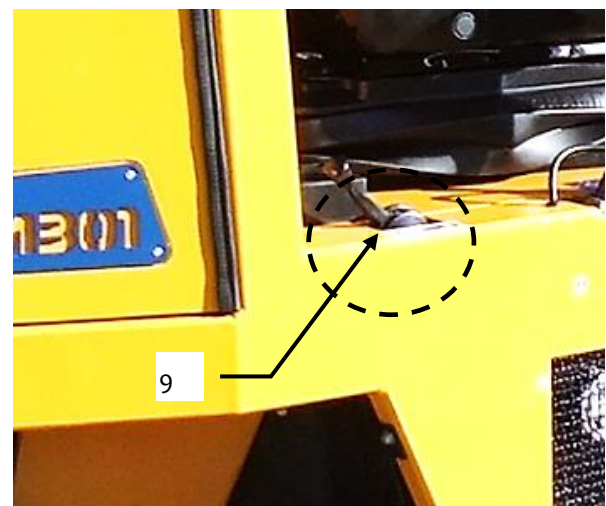
- Before starting the VM-301-PAVERMAX put in the main switch (8)
- The main switch is below the engine cover on the right hand side.



4.1.6 Accelerator

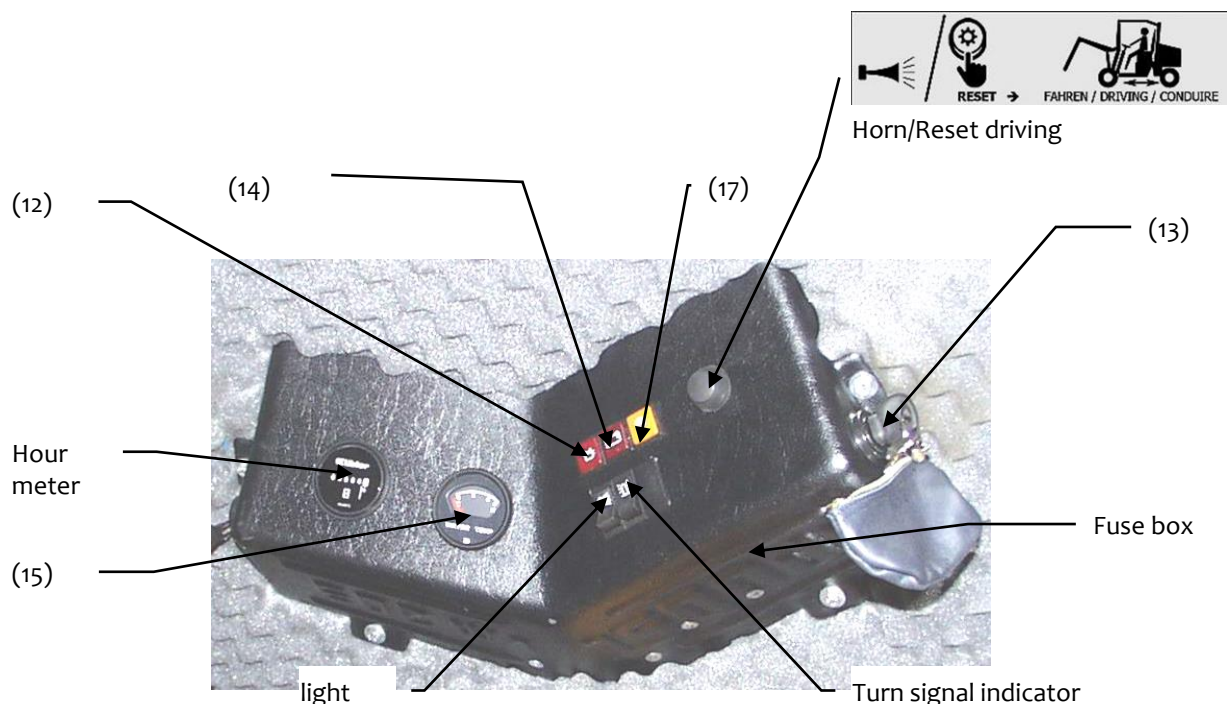
Lever of the accelerator (9) has to stay in position by the friction of the spring washers

To adjust the lever of the accelerator the stop nut on the inside of the lever has to be tightened by a key size 13.



4.1.7 Control displays

Oil pressure control	The oil control light (12) has to be illuminated when the ignition (13) is on step 1. The light must not be illuminated when the motor is running.
Battery control	The battery control light (14) has to be illuminated when the ignition (13) is on step 1. The light must not be illuminated when the motor is running.
Temperature control	If the water temperature control display (15) is in the red section, the air filter has to be cleaned or renewed. The cooling fins of the radiator have to be cleaned with compressed air and the cooling water has to be checked. If the temperature control display is still in the red section please contact a qualified workshop.
Pre-heat	Turn ignition to step II until the pre-heat control display (17) is illuminated. After a short time (approx. 25 sec.) the pre-heat control display has to stop the illumination. This means that the engine can be started now by turning the ignition to step III.
Fuse box	The fuse box is behind the covering of the control displays. For changing fuses remove the fixing bolts at the control-displays covering.
Horn/Reset – driving (safety seat switch)	Button for horn / reset button: Press reset button each time for the driving, when the machine will be started and when the driving was stopped caused by the standing up of the diver from the driver's seat (triggered by the seat switch). The reset button only works, when the driver is sitting on the s seat.

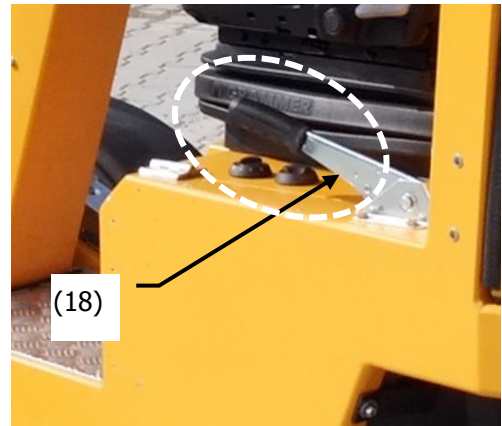


4.2 Starting the engine

- Insert and activate main switch (8) before starting (**always take this main switch with you after end of work → security of the VM against theft!**)
- Before starting the engine daily checks have to be carried out.
- Pull hand break (18).



(8)



(18)



- **The driver must be sit on the driver's seat and the seat belt must be worn.**

- Insert ignition key into the ignition lock.
- Turn ignition key to step I and check if all control lights are illuminated. Then turn to step II and hold it there, wait until the control light is going out, then turn ignition key to step III to start the engine.
- Put the accelerating lever (9) to middle position in order to have enough hydraulic pressure to operate the unit.
- **Press the reset button (button for horn).**
Horn sounds (once), to warn people standing nearby the machine, that the machine will be drive off soon.
- To stop the engine turn the ignition key to step 0.



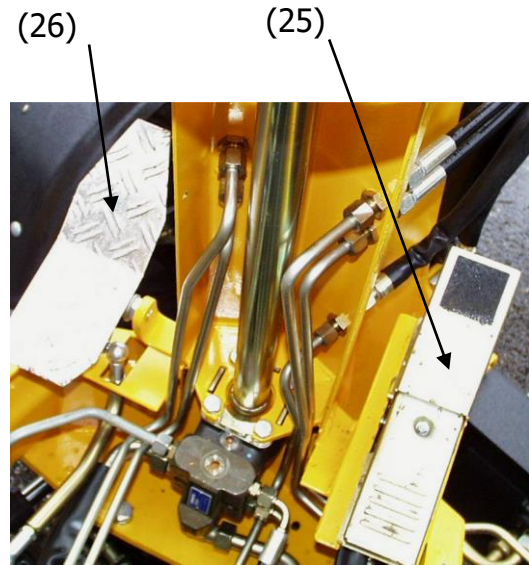
- Press reset button each time for the driving, when the machine will be started and when the driving was stopped caused by the standing up of the diver from the driver's seat (triggered by the seat switch).
- **The reset button only works, when the driver is sitting on the s seat.**

4.3 Driving with the VM-301-PAVERMAX



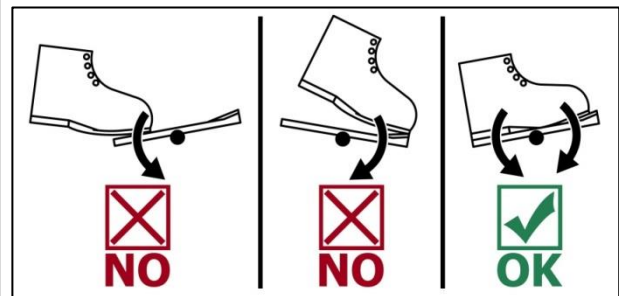
- Driving backwards with the laying machine, take care of the „blind angle“, otherwise danger of accident or danger to life.
- If you leave the laying machine lay down the lifting arm and the attached device (e.g. HVZ-uni).
- Driving on a **hillside** observe following points:
 - Lower the lifting arm with attached device (e.g. HVZ-uni) with or without load as far as possible.
 - Drive very carefully and slowly (slow walking speed).
 - It is not allowed to decelerate in an abrupt way (by switching the dring direction with the foot pedal)!
Tilting danger! (danger of accident and danger to life)!!!
- **Emergency situations:** If the machine is in danger of **tilting**, immediately lower down the lifting arm!

- Adjust the driver's seat according to the driver's height and weight. Lever (right hand, below) forward and backward. Treble height adjustment: pull the complete seat upwards. Lever for adjust backrest back and forth (rear, left hand). Turn at twist handle to the right or left to adjust the weight of the driver (twist handle is at the front in the middle, below).
- Start of the engine.
- Release the hand break only when the driver is on the driver's seat. When the driver is leaving the seat he has to tighten the hand break again.
- The right foot pedal (25) is for hydrostatic drive. This allows the smooth driving forward and backward. This pedal must not be mixed up with the accelerator pedal of a car.
- Pushing the pedal forward, machine will drive forward
- Pushing the pedal backwards, machine will drive backwards
- To slow down, the foot pedal has to be put to the neutral position.
- To come to a quick stand still, the foot pedal can be put for a short time to the opposite direction.



Pedal **should not** be operated with toes only!

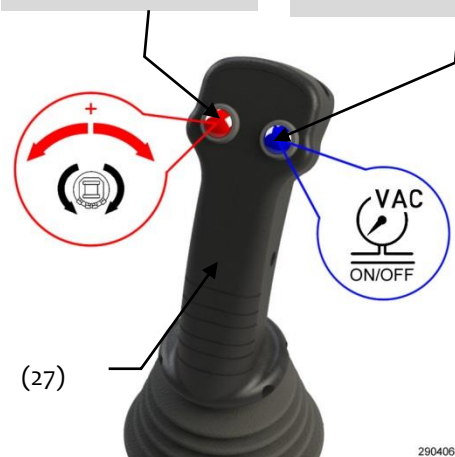
To react quickly in a danger situation, the shoe has to be fully positioned on the foot pedal.



- The left foot pedal (26) is for lifting and lowering of the arm.
- Pushing the foot pedal forward, the arm will lower down
- Pushing the foot pedal backward, the arm will lift.
- Never operate the foot pedals abruptly or let them jump back to the neutral position, because the hydraulic pressure shocks could create wear and damage as well as faults in function
- The joystick (27) is used to control all additional components (see Fig. A).

Button (red) for hydraulic rotator (anti- and clockwise rotation)


Button (blue) for vacuum operation (suction and release load)



29040681

Vacuum operation:

- Vacuum on → press blue button on the Joystick.
- Move the lifting arm downwards with the left foot pedal (Fig. B).
- Place the vacuum suction plate on the load (stone slab).
- Move the lifting arm upwards with the left foot pedal.

- Drive with load (stone slab) carefully to the place of destination.
- Lower the load (with the left foot pedal → Fig. B).
- Place the load on the floor and move the joystick forward (vacuum is interrupted).
-  Immediately move the lifting arm upwards. Otherwise, after the joystick has been released (in middle position), the vacuum operation is immediately active again!
- Switch off the vacuum → press the blue button on the joystick.

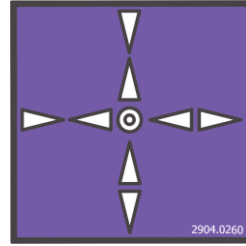


Fig. A

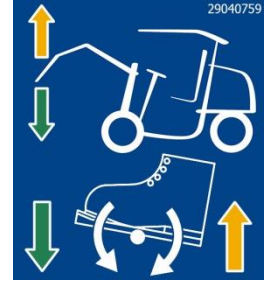


Fig. B

4.4 Fixing of attachments

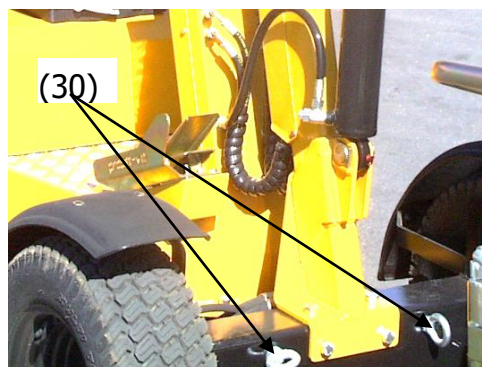
- Different attachments (HVZ/-uni) can be mechanically fixed to the lifting arm
- For the hydraulic operation there are two different hydraulic circuits available.



4.5 Transportation of the VM-301-PAVERMAX

- Lifting equipment is not essentially required. The VM-301-PAVERMAX can be driven to the trailer or the truck by using suitable planks.
- Just use proper planks, be aware of the different track width on front and rear!
- For transportation the hand break has to be tightened and the VM has to be secured additionally to avoid shifting and rolling to correspond with the regulations.
- For fixation in front and rear there are two eyebolts (30) fixed to the VM.





4.6 Bypass-valve (towing the VM-301-PAVERMAX)

- It is possible to move the laying machine VM-301-PAVERMAX without engine power (e.g. engine damage). Only open the bypass-valve (at the hydrostat under the driver's seat).
- Open the engine cover - by pulling the handle (**Fig. A**) and tip the engine cover backwards (**Fig. B**).
- Release the locking (see arrow ↙) of the driver seat on the right side (in travelling direction) **Fig. C + D**, to fold the driver's seat → **Fig. E**

Before fold the driver's seat upwards, remove the rear window at the left (in direction of traffic) if available.

Open the bypass-screw 2-3 rotations with a suitable flat-wrench → **Fig. F**

- Now the laying machine VM-301-PAVERMAX can be moved without engine power (only the wheels will rotate) e.g. on a trailer.
- Just use proper planks, be aware of the different track width on front and rear!



Important: Tighten (close) the bypass-screw with the wrench before you restart the engine!!!

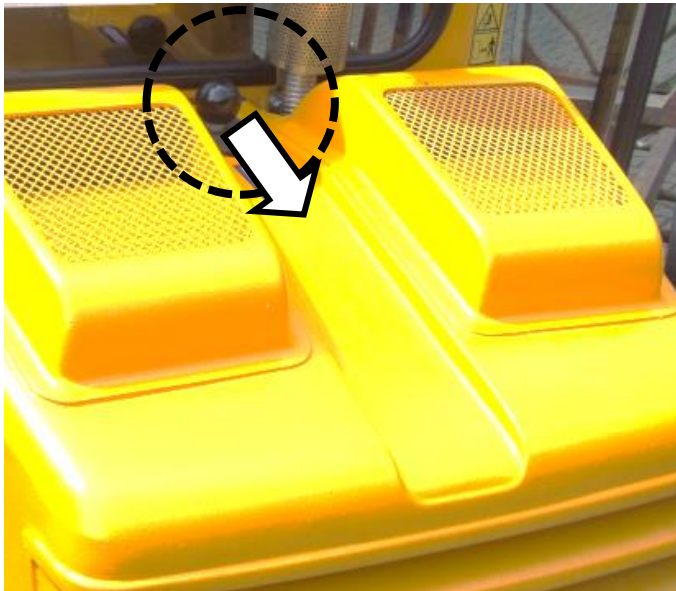


Fig. A



Fig. B

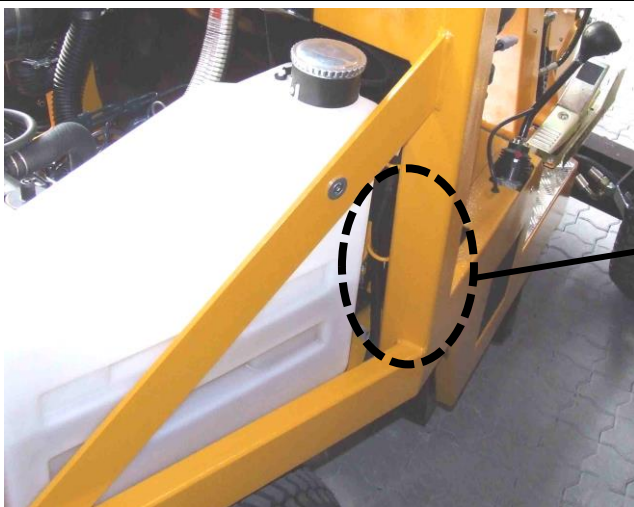


Fig. C

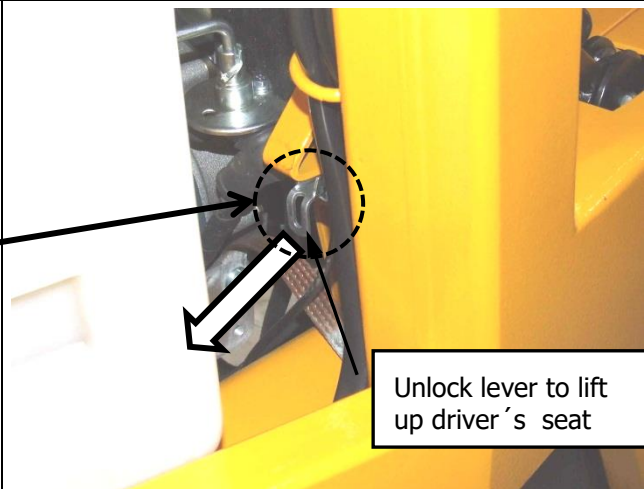


Fig. D

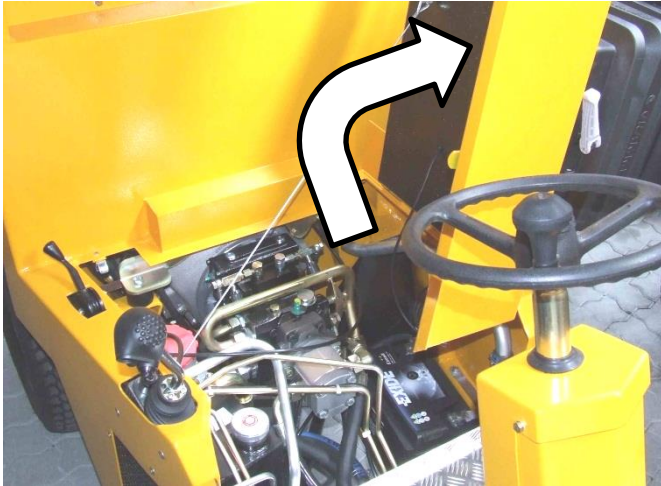


Fig. E

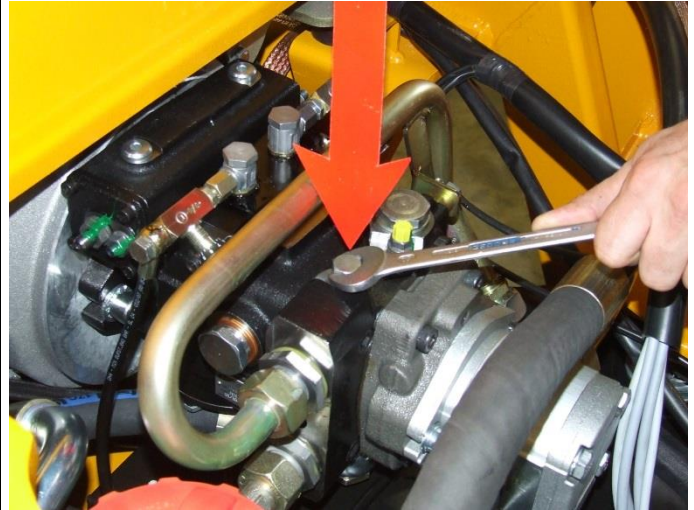


Fig. F

4.7 Long-term storage of VM-301-PAVERMAX

If the installation machine must be stored during a longer period:

- store the installation machine at an even and dry place in a hall or,
- place, when storing the installation machine outside on a timber platform and cover it completely with a dark cover
- protect the installation machine against direct sea-air (danger of corrosion!)
- retract hoist cylinder
- clean and oil all construction units (joints) and the motor complete, or lubricate according to the lubrication chart
- disconnect the battery from the motor
- pour enough antifreeze into the cooling water in the winter months and refuel winter Diesel
- place the attached installation clamp (HVZ) on the ground (lay timber beams under the steel grippers)
- close main clamping at the installation clamp (HVZ)
- open side clamping at the installation clamp (HVZ)

5 Maintenance and care

5.1 Maintenance



To ensure the correct function, safety and service life of the device the following points must be executed in the maintenance interval.

Used **only original spare parts**, otherwise the warranty expires.



All operations may only be made in closed state of the device!

For all operations you have to make sure, that the device will not close unintended. Danger of injury!!!

5.2 MECHANICAL

SERVICE INTERVAL	Maintenance work
First inspection after 25 operating hours	<ul style="list-style-type: none"> Control and tighten all screws and connections. (The implementation is only allowed by an expert).
All 50 operating hours	<ul style="list-style-type: none"> Tighten all screws and connections (take care that the tightening torques according to the property class of the screws are observed). Check all existing safety elements (such as linchpins) for perfect function and replace defective safety elements. Check all joints, bolts, guidance's and gears for correct function, if necessary adjust or replace it. Check all Grippers (if available) for signs of wear. Grease all slidings (if available) when the device is in opened position with a spatula. Grease all grease nipples (if available) with a grease gun.
Minimum 1x per year (at rough conditions shorten the interval)	<ul style="list-style-type: none"> Check of all the suspension parts, bolts and straps. Check for corrosion and safety by an expert.

After 50 operating hours

- Retighten all 5 mounting nuts (M7) at the exhaust silencer → 18-20 Nm.



Sequence for tightening torque: see marking ① - ⑥

5.3 HYDRAULIC

Service interval	Maintenance work
First inspection after 25 operating hours	<ul style="list-style-type: none"> • Control and tighten all hydraulic thread joints and connection. (The implementation is only allowed by an expert).
All 50 operating hours	<ul style="list-style-type: none"> • Tighten all hydraulic connections. • Check the hydraulic system for leaks. • Check the hydraulic oil filter, clean it if necessary (if available). • Check the hydraulic oil and replace it in accordance to the manufacturer information (recommended hydraulic oil: HLP 46 according to DIN 51524 – 51535). • Check the hydraulic hoses for breaks and abrasion.
Only specified types of oil may be used!	

Regular Inspections (refer to enclosed KUBOTA operating manual)

To maintain efficient engine functions and to ensure long engine service life, inspections are required at scheduled intervals in accordance with the following table.

No.	Description (* Order number see proof of maintenance f)	First 50 h	Every 200 h	Every 1000 h	Every year
1	Exchange engine oil (SAE 15W40 ~ 4 l)	●	●	●	
2	Exchange oil filter *	●	●	●	●
3	Exchange hydraulic oil (RANDO HLP 46 ~ 25 l)	●		●	●
4	Check level hydraulic oil if necessary refill (RANDO HLP 46 ~ 25 l)		●	●	
5	Exchange hydraulic oil filter *	●		●	●
6	Clean air filter (renew when strong pollution) *	●	●	●	●
7	Exchange fuel filter *	●		●	
8	Exchange fuel pre-filter *	●	●	●	
9	Check fuel pipes and hose clamp	●	●	●	●
10	Check battery acid level and oxidized connections	●	●	●	
11	Check fan belt tension (fan wheel)	●	●	●	
12	Exchange fan belt (fan wheel) *			●	
13	Check radiator hose and hose clamp (if necessary renew)		●	●	●
14	Remove sediments from fuel tank			●	
15	Check cooling ribs on pollution		●	●	
16	Check electric wiring for loose connections	●	●	●	●
17	Replace ignition tube and hose clamp			●	●
18	Recharge the battery (if necessary renew)			●	●
19	Check cooling water level (if necessary refill)	●	●	●	●
20	Exchange cooling water including antifreeze (~ 4 l)			●	●
21	Check antifreeze in cooling water (before each frost period)			●	●
22	Check opening pressure of radiator cover lid		●	●	
23	Check jet opening pressure			●	
24	Check compression pressure			●	
25	Check hydraulic hoses on leakages (retighten connections)	●	●	●	
26	Check function of instruments and operating elements	●	●	●	
27	Check VM for defective, distorted construction units and abnormal noises	●	●	●	
28	Retighten all screws and nuts, replace missing screw connections	●	●	●	
29	Check tyre pressure (front 2,5 bar/36 psi, rear 2,2 bar/32 psi)	●	●	●	
30	Lubricate according to lubrication chart	●	●	●	
31	Check ball joint on strength (135 Nm)	●	●	●	
32	Check carrying construction units on cracks		●	●	●
33	Retighten all wheel nuts (130 Nm)	●	●	●	
34	Check hand brake (if necessary readjust 3-4 teeth)		●	●	
35	Check wheel bearing and axle bearing (if necessary readjust)			●	
36	Check steering clearance (if necessary renew spherical head or tie rod) *			●	
37	Check dynamo			●	
38	Adjustment valve clearance of rocker lever (0,15 mm)			●	

To disconnect the electric system from the battery, the main switch must be activated at the VM-301-PAVERMAX at the right hand side and at the VM 204 at the left hand side of the engine under the hood. At about the same place, there is a lock to be pulled out to unlock the cover, where the seat is fixed to.

At welding the battery main switch must be switched off general. Otherwise the electronic could be damaged!

Daily check before starting: Engine oil level, coolant, antifreeze, mater level hydraulic fluid level, battery, "V" belt tension.

The claim under guarantee for this device only exists and is subject to the proper execution of the mandatory maintenance works (see attached booklet proof of maintenance)!

(In case of warranty request please always attach a copy of the proof of maintenance)

5.4 Recharging of the battery

- Open engine cover by pulling the handle and tip the motor hood backwards (Figure 1)
- Unlock the lever (see ↘) to lift up the drivers seat (right hand at the rear in the engine compartment) to arrive to the battery (Figure 2 and 3).



Figure 1

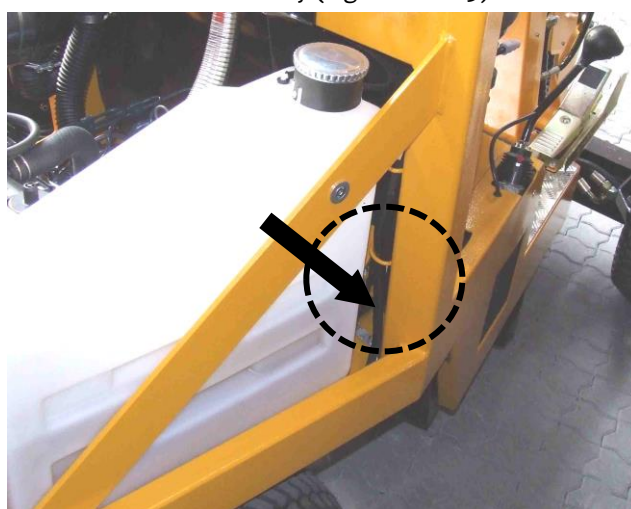


Figure 2

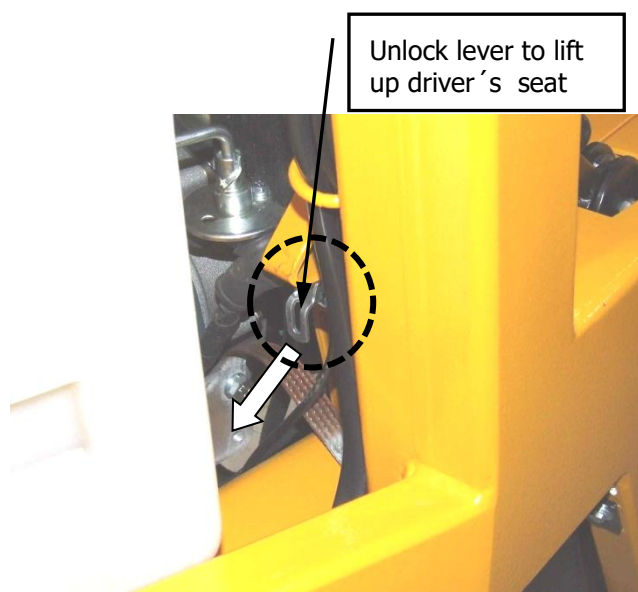


Figure 3

- Before fold the driver's seat upwards, remove the rear window at the left (in direction of traffic), if available.
- Fold the driver's seat upwards - carefully avoiding danger of injury! Now the battery can be recharged.

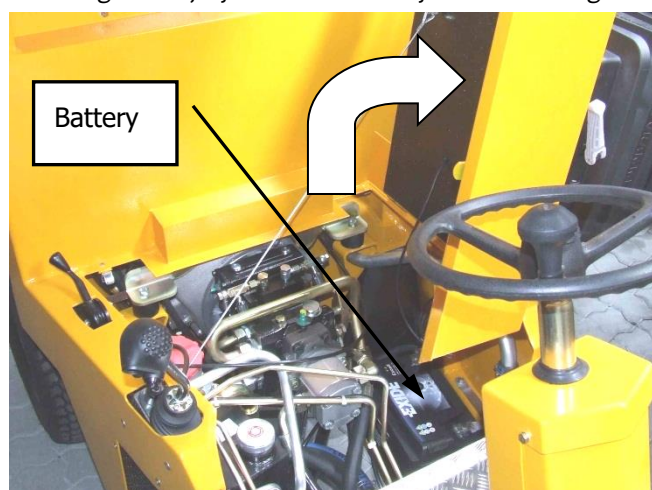
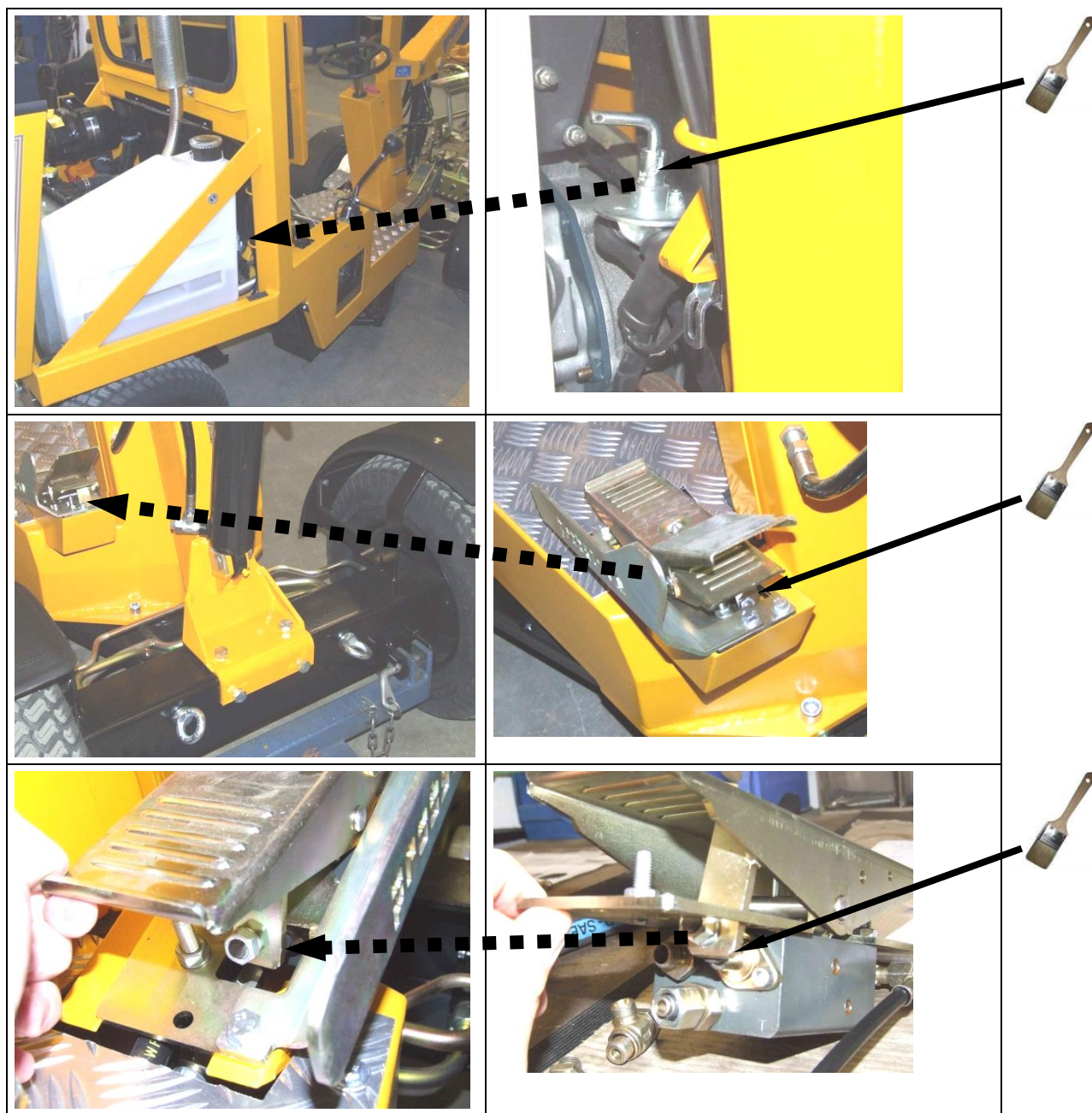
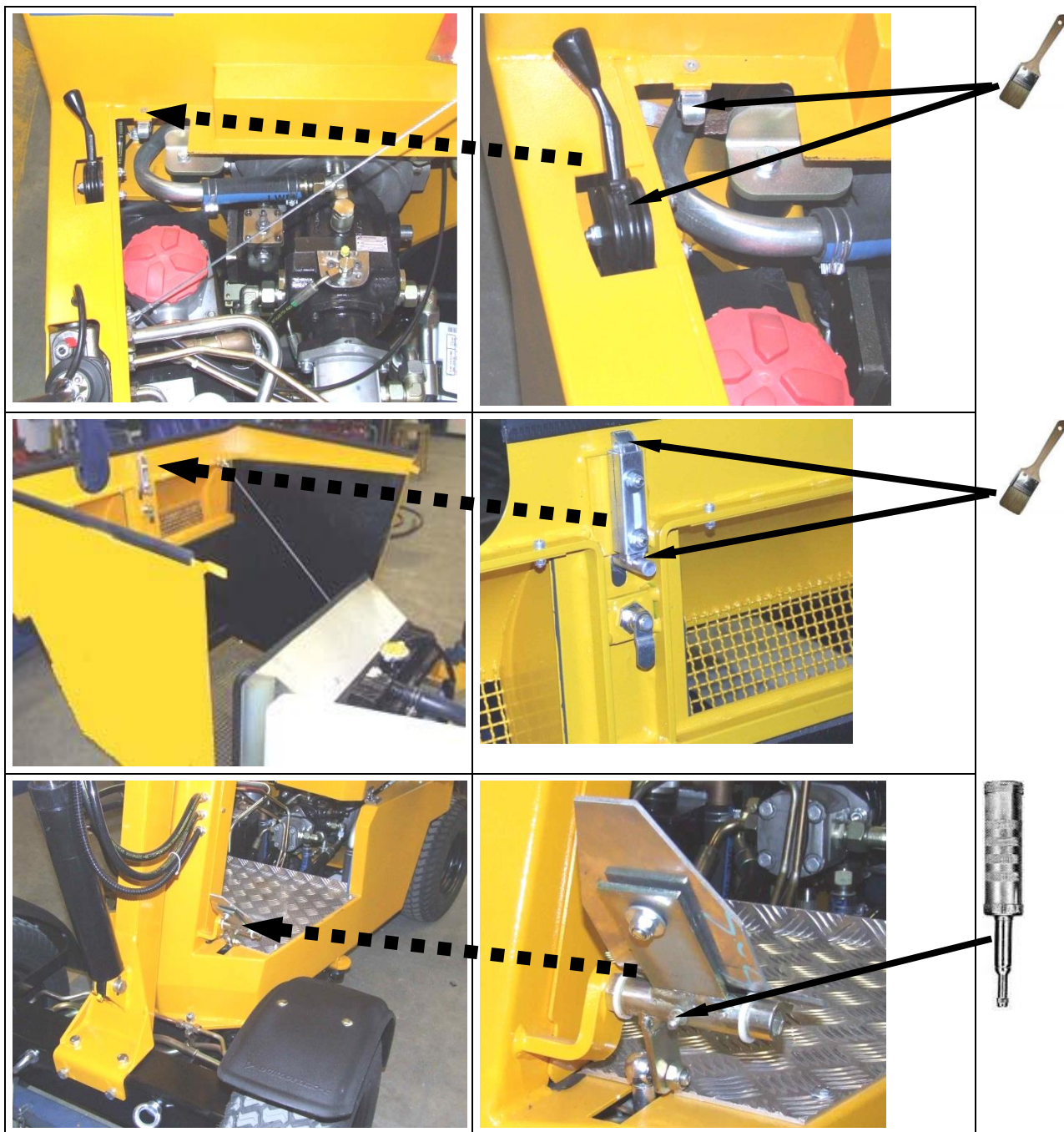
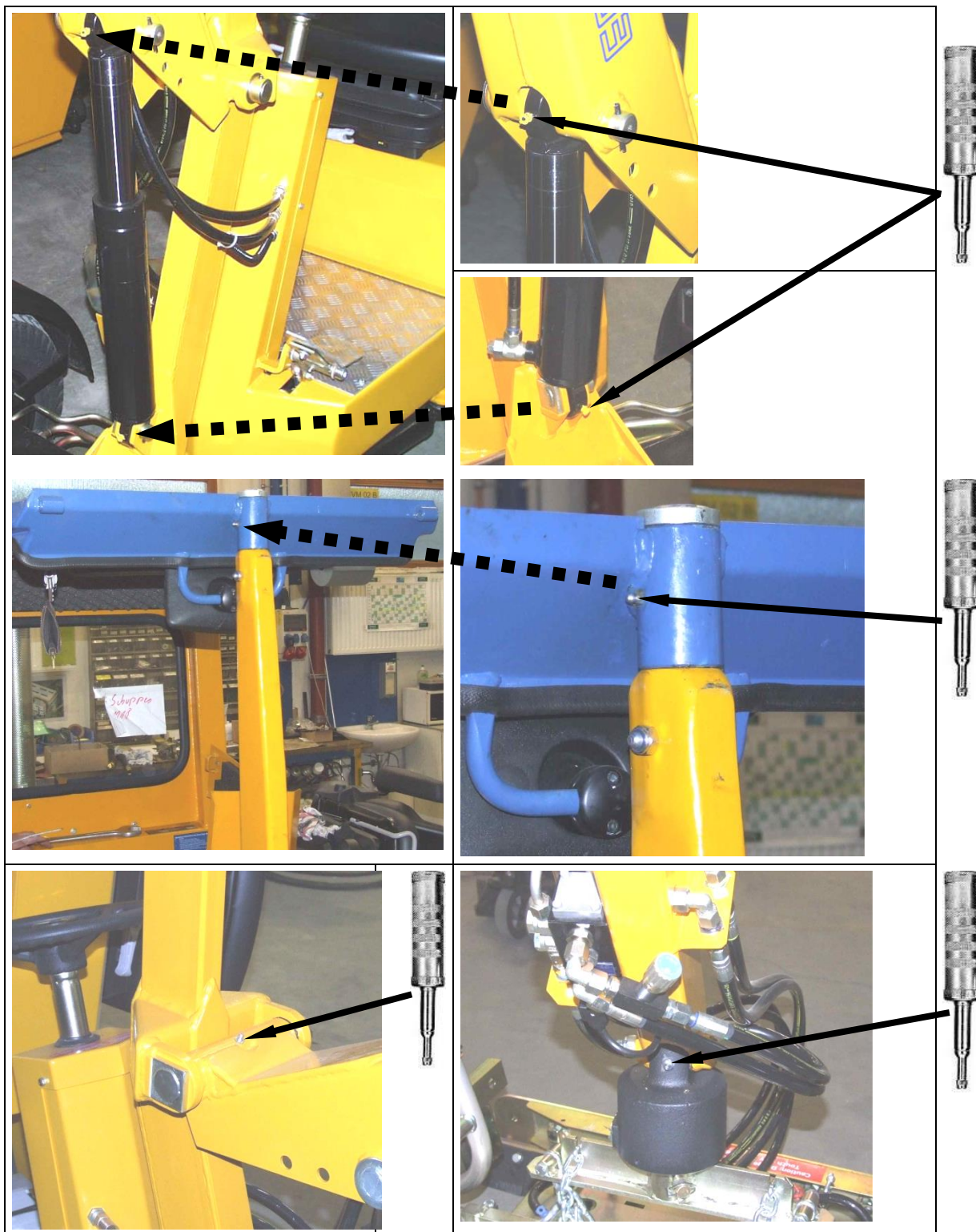


Figure 4

5.5 Lubrication Chart







5.6 Trouble shooting

Problem	Possible reason	Repair
Engine does not work		Refer to operation manual for Kubota engine
Engine is running, but VM does not run	<ul style="list-style-type: none"> • Seat switch is active 	Press one time the reset button (horn button)
Accelerator lever is loose	<ul style="list-style-type: none"> • Not enough friction stop nut is loose 	<ul style="list-style-type: none"> • Tighten stop nut
Handbreak does not work	<ul style="list-style-type: none"> • The brake lining is worn • The rope of the hand break is loose 	<ul style="list-style-type: none"> • Replace the brake lining • Adjust the hand break
VM-301-PAVERMAX does not start	<ul style="list-style-type: none"> • Main switch is not in position • A fuse is defect • Battery is defect • No fuel in the tank • No pre-heating 	<ul style="list-style-type: none"> • Put the main switch in the right position • Check all fuses • Check the battery • Refuel the VM-301-PAVERMAX • Pre-heat, then start
Arm can not be lifted	<ul style="list-style-type: none"> • Hydraulic system is not tight. • Not enough hydraulic pressure 	<ul style="list-style-type: none"> • Check the hydraulic system • Put the accelerator minimum in ½ power position • Check oil level.

5.7 Repairs

- Only persons with the appropriate knowledge and ability are allowed to repair the device.
- Before the device is used again, it has to be checked by an expert.

5.8 Safety procedures

- It is the contractors responsibility to ensure that the device is checked by an expert in periods of max. 1 year and all recognized errors are removed (→ see BGR 500).
- The corresponding legal regulations and the regulations of the declaration of conformity have to be observed!
- We recommend, that after checking the device the badge „Safety checked“ is put on the device. (Order-No.: 2904.0056+inspection sticker with date).
- You can receive these badges from us.



The check by an expert must be proved!

Device	Year	Date	Expert	Company

5.1 Hints to the identification plate



Type, serial-number and production year are very important for the identification of your device. If you need information to spare-parts, warranty or other specific details please refer to this information.

The maximum carrying capacity is the maximum load which can be handled with the device. Do not exceed this carrying capacity.

If you use the device in combination with other lifting equipment (Crane, chain hoist, forklift truck, excavator) consider the deadweight of the device.

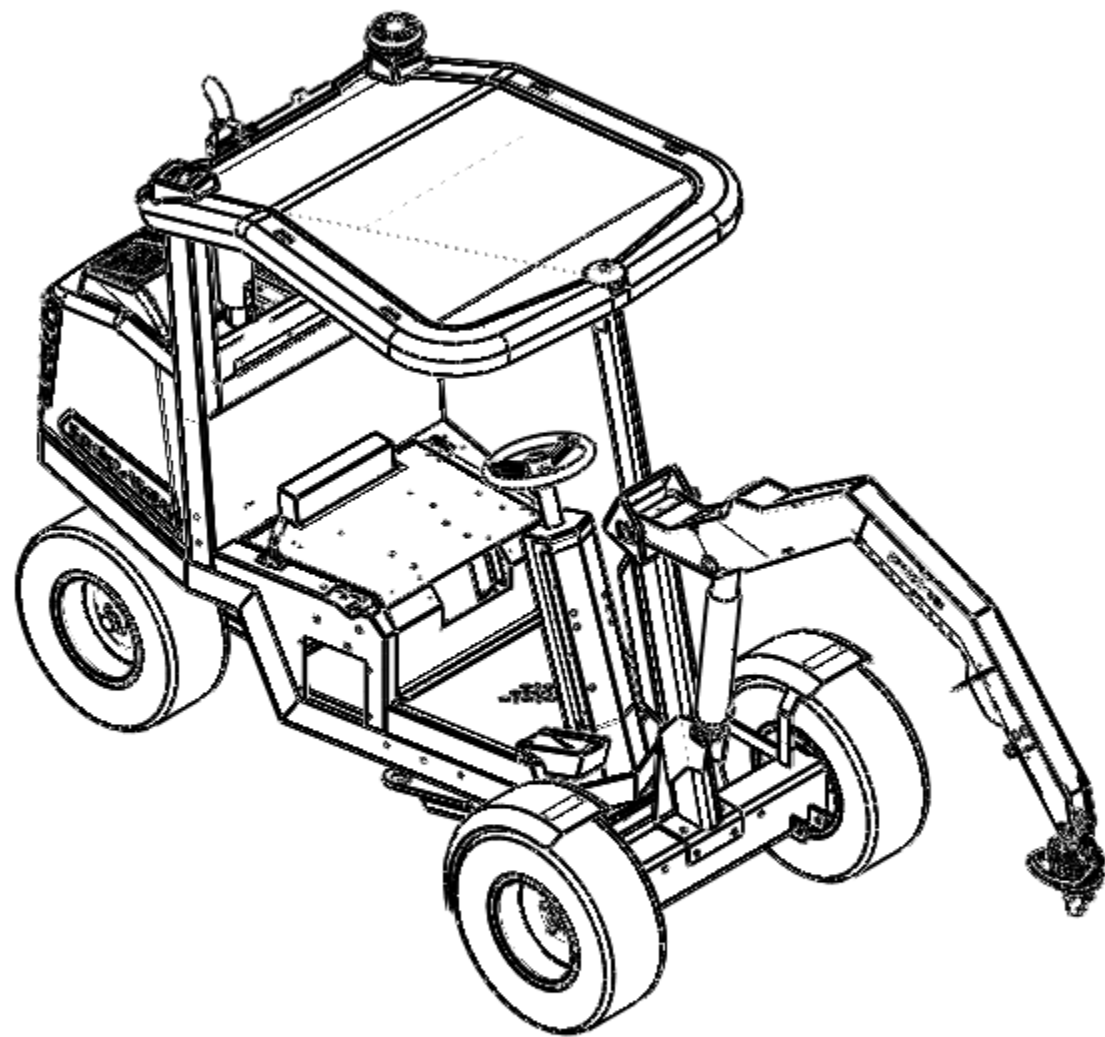
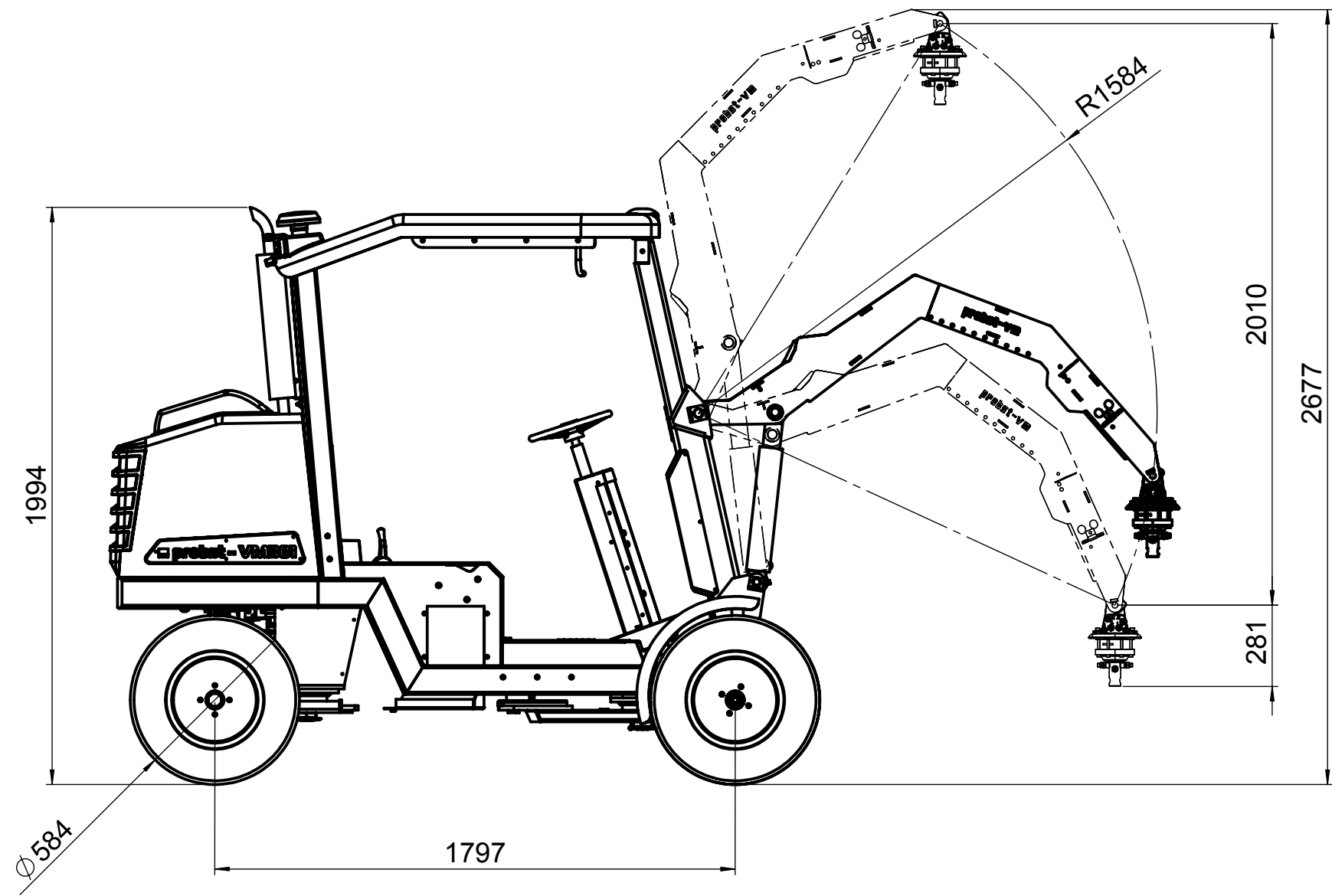
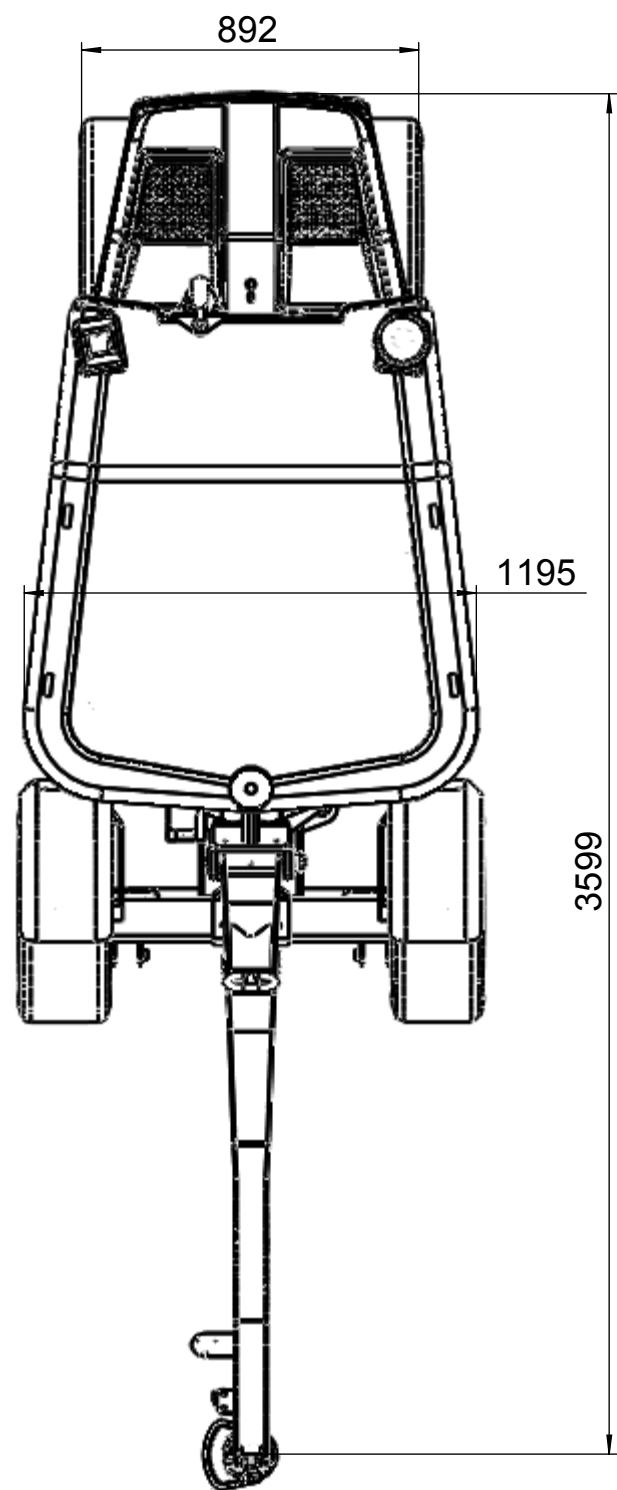
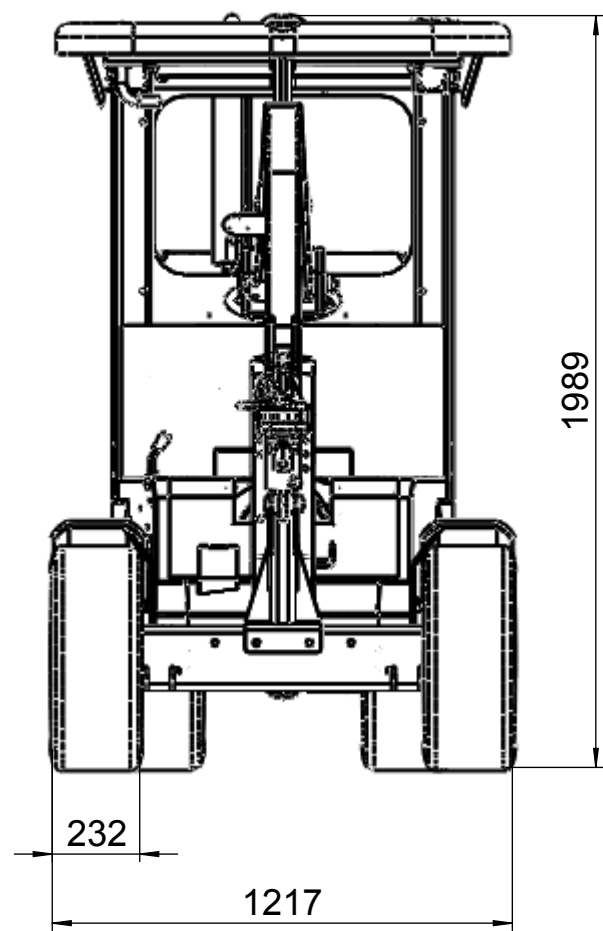


Example:

5.2 Hints to the renting/leasing of PROBST devices




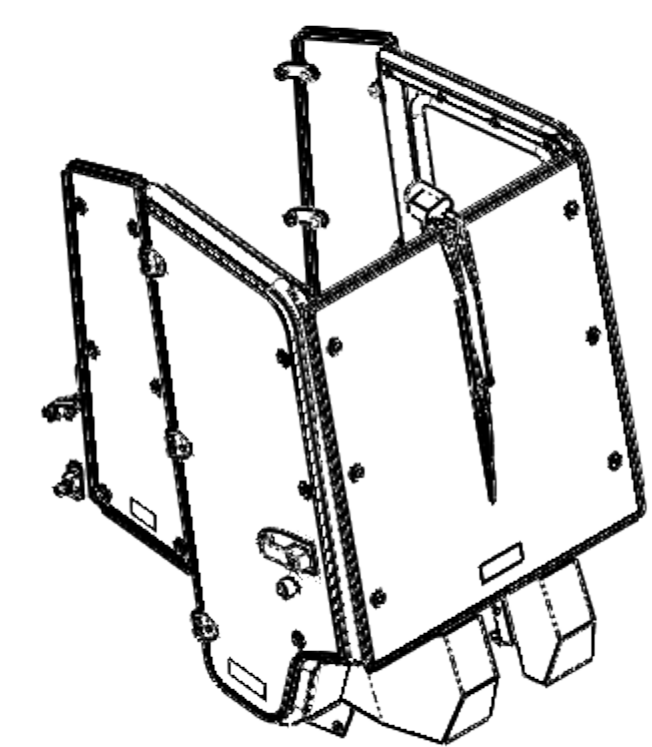
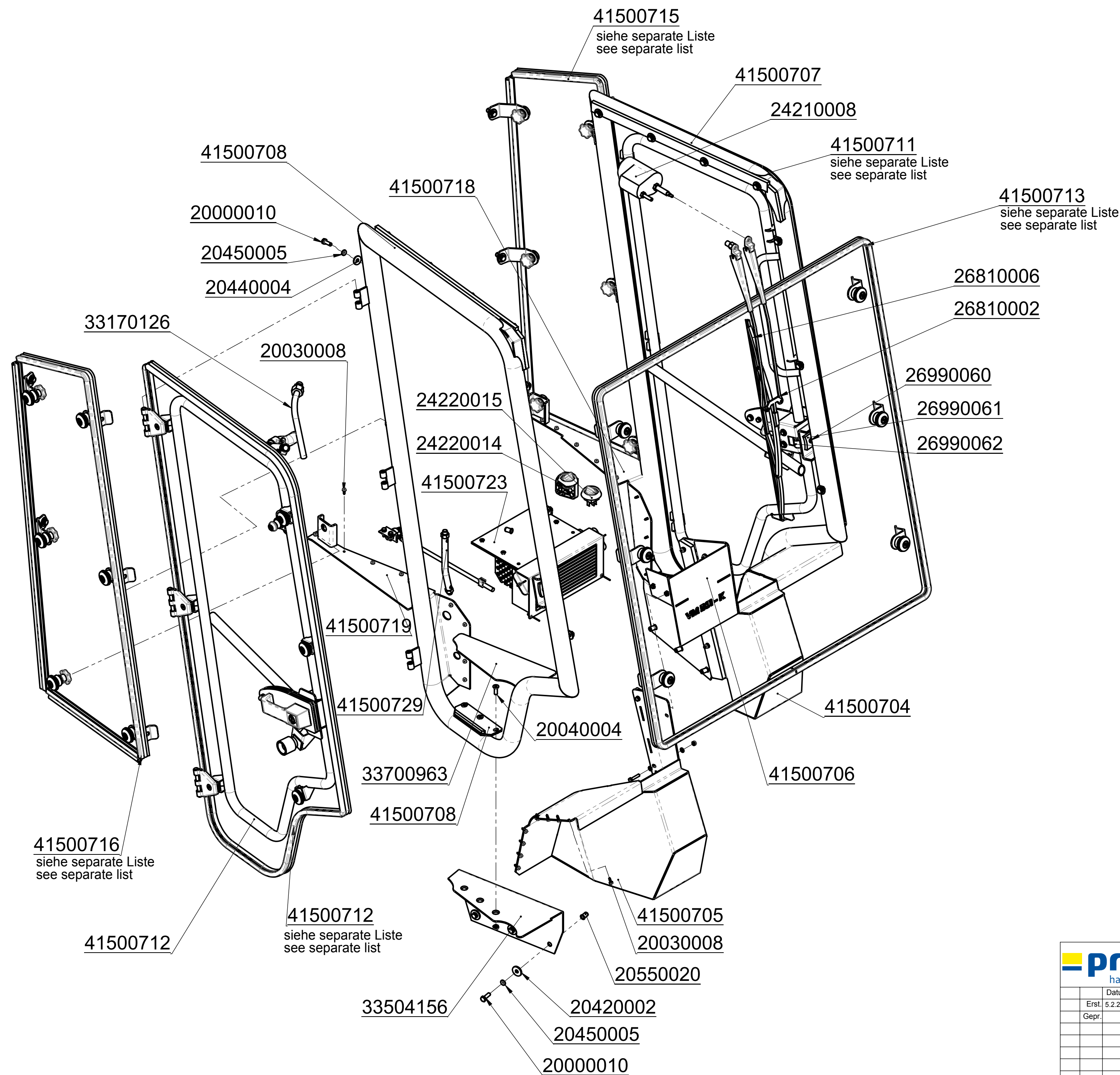
With every renting/leasing of PROBST devices the original operating instructions must be included unconditionally (in deviation of the users country's language, the respective translations of the original operating instructions must be delivered additionally)!



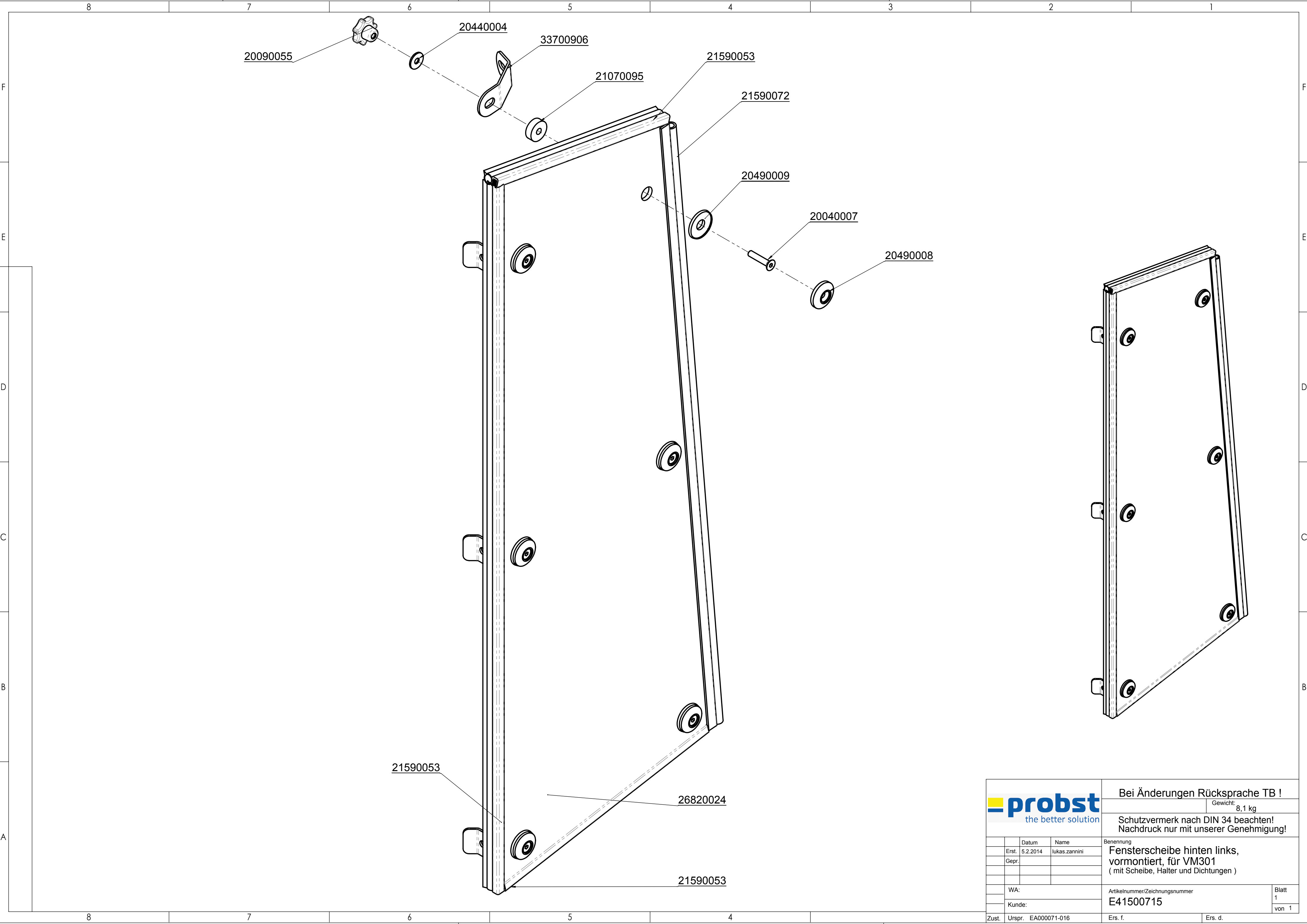
Tragfähigkeit: 500 [kg]
Carrying Capacity: 500 [kg] / (1100 lbs.)


Installation Machine VM301 PAVERMAX

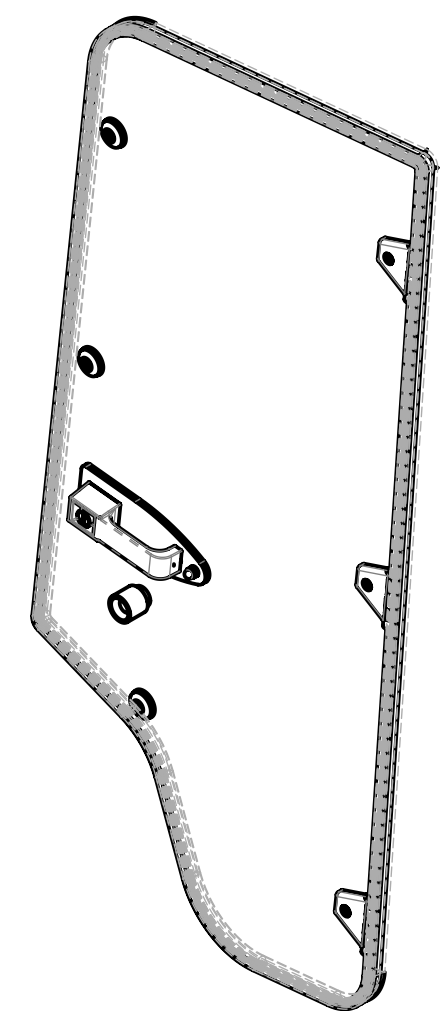
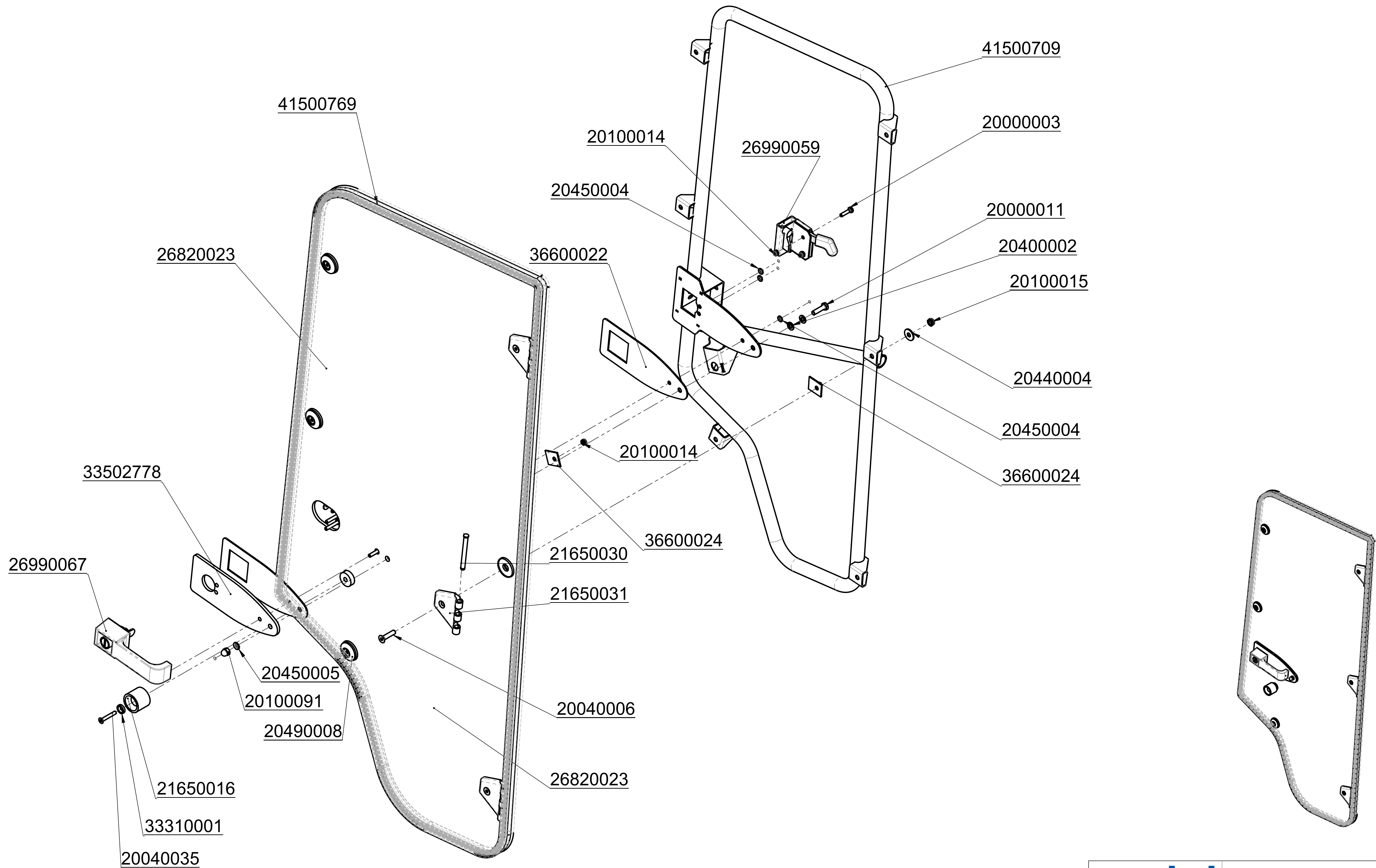
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				Gewicht:	912,4 kg
				Schutzvermerk nach DIN 34 beachten! Nachdruck nur mit unserer Genehmigung!	
		Datum	Name	Benennung	
	Erst.	17.1.2014	M.Kaltenbach	Verlegemaschine VM301	
	Gepr.			PAVERMAX	
				ohne Kabine, ohne HVZ-uni, mit Drehkopf GR10-2	
	WA:			Artikelnummer/Zeichnungsnummer	
	Kunde:			D51500020	
				Blatt 1	
Zust.	Urspr.			Ers. f.	Ers. d.
				von 1	



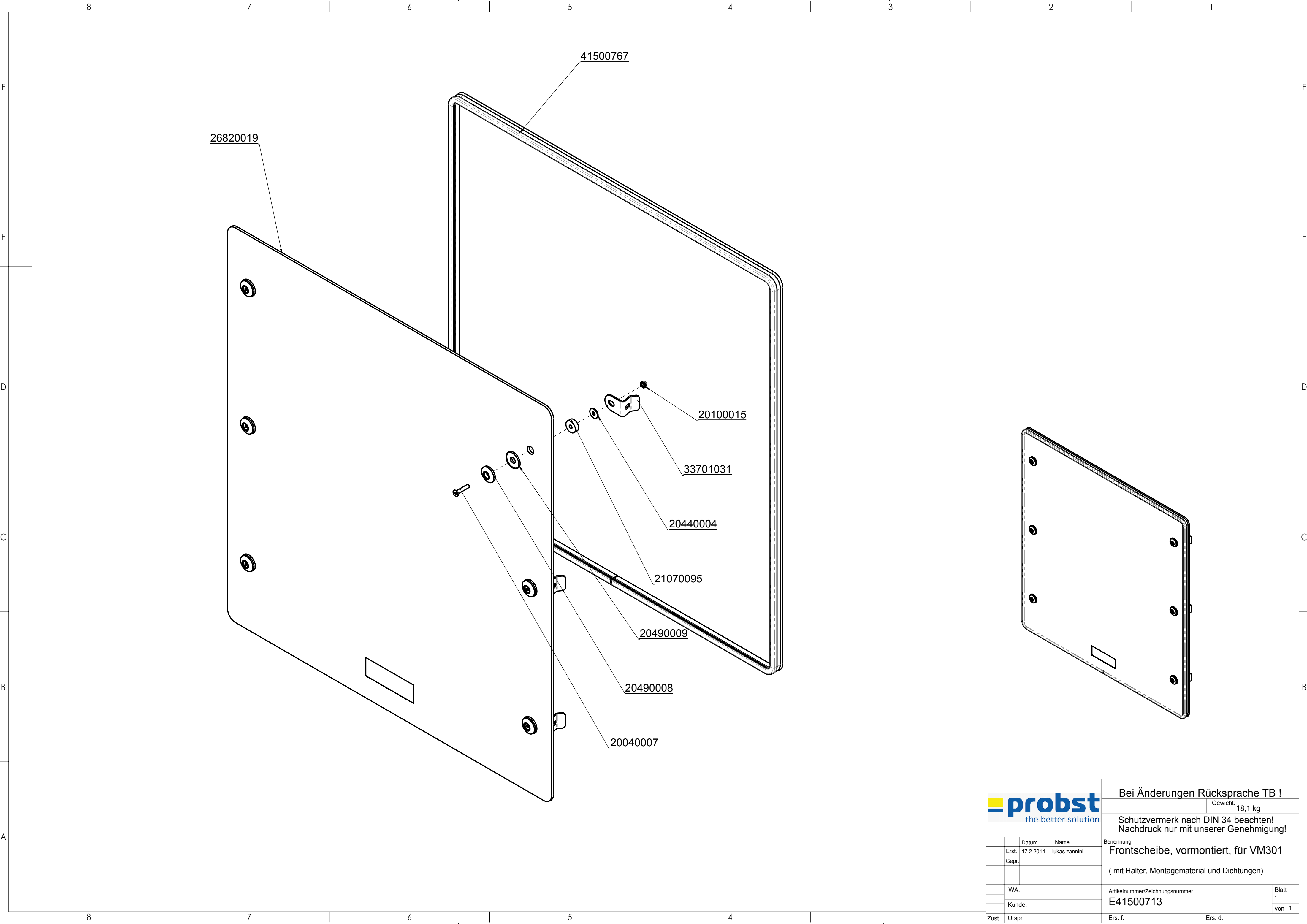
probst handling equipment			© all rights reserved conform to ISO 16016	
	Datum	Name	Benennung	
Erst.	5.2.2014	lukas.zannini	Ausstattungspaket >Kabine mit	
Gepr.			Veglasung und Heizung<	
			für Verlegemaschine VM301	
			Artikelnummer/Zeichnungsnummer	Blatt
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				von 1
Zust.	Urspr.		Ers. f.	Ers. d.




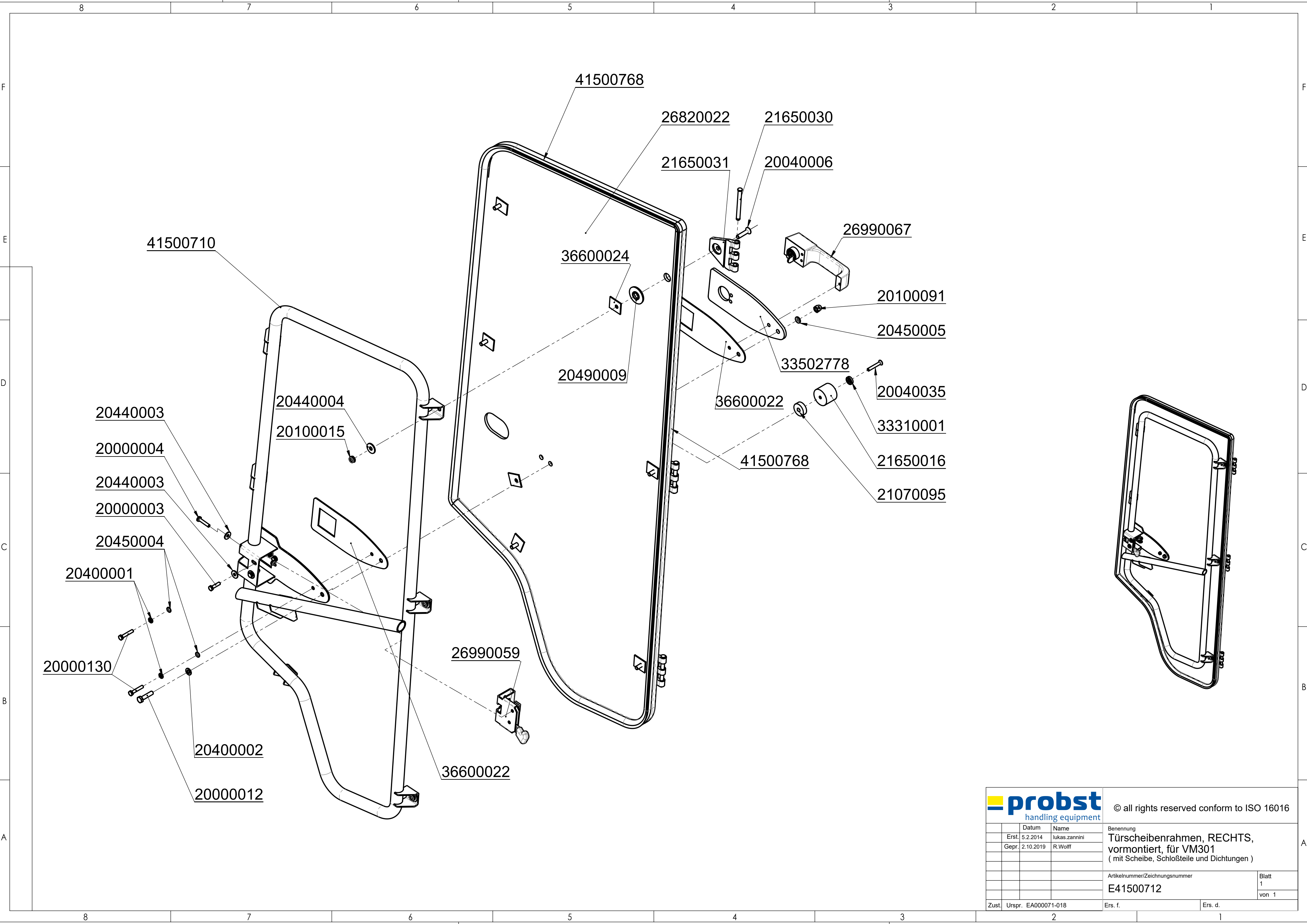
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			Gewicht: 8,1 kg	
			Schutzvermerk nach DIN 34 beachten! Nachdruck nur mit unserer Genehmigung!	
		Datum	Name	
	Erst.	5.2.2014	lukas.zannini	
	Gepr.			
			Benennung	
			Fensterscheibe hinten links, vormontiert, für VM301 (mit Scheibe, Halter und Dichtungen)	
	WA:			Blatt
	Kunde:			1
				von 1
Zust.	Urspr.	EA000071-016		Ers. d.
				Ers. f.



			© all rights reserved conform to ISO 16016	
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	Gepr. 15.1.2018	M.Kaltenbach		
			Artikelnummer/Zeichnungsnummer	
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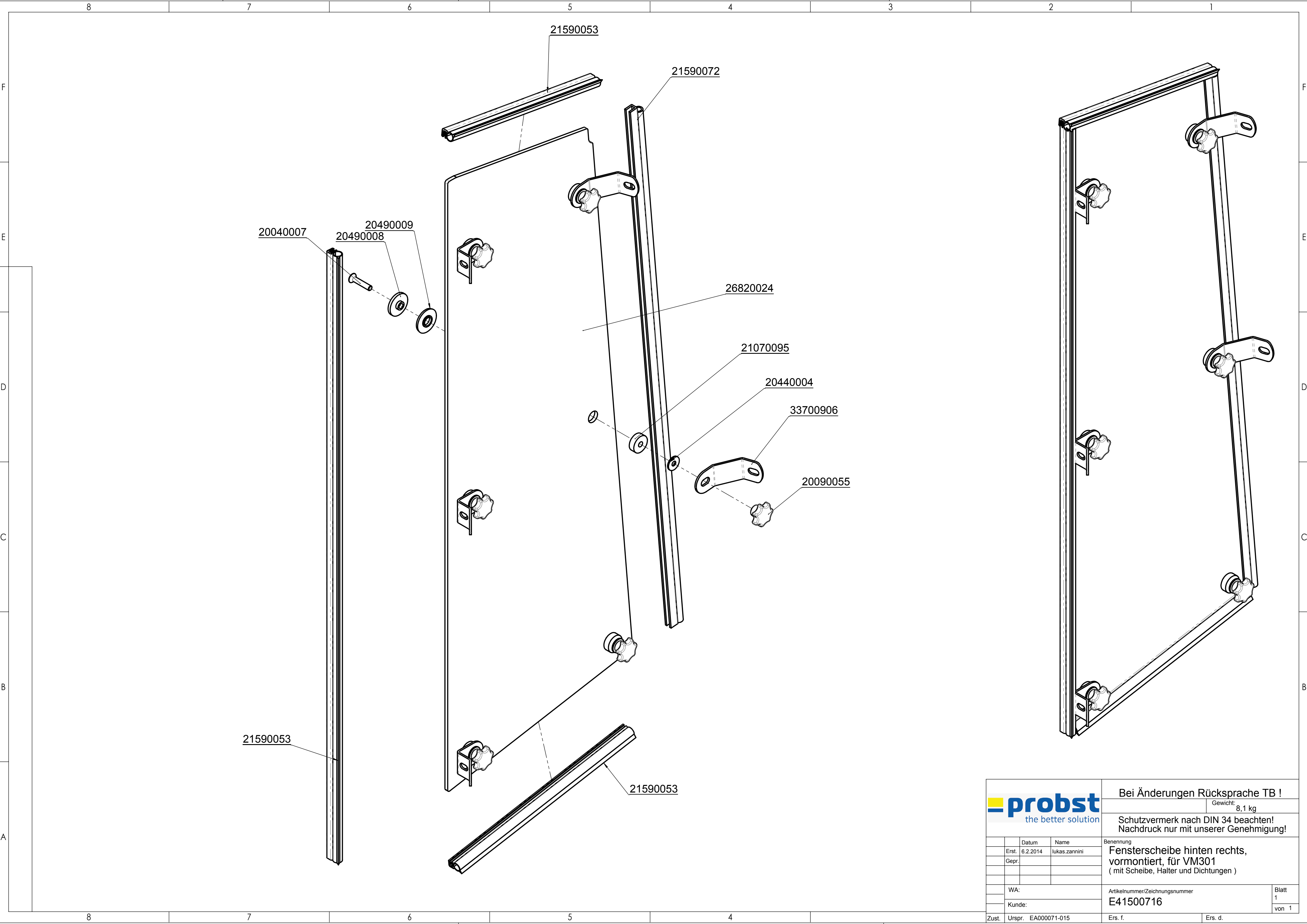


 probst the better solution		Bei Änderungen Rücksprache TB !	
			Gewicht: 18,1 kg
		Schutzvermerk nach DIN 34 beachten! Nachdruck nur mit unserer Genehmigung!	
	Datum	Name	
Erst.	17.2.2014	lukas.zannini	
Gepr.			
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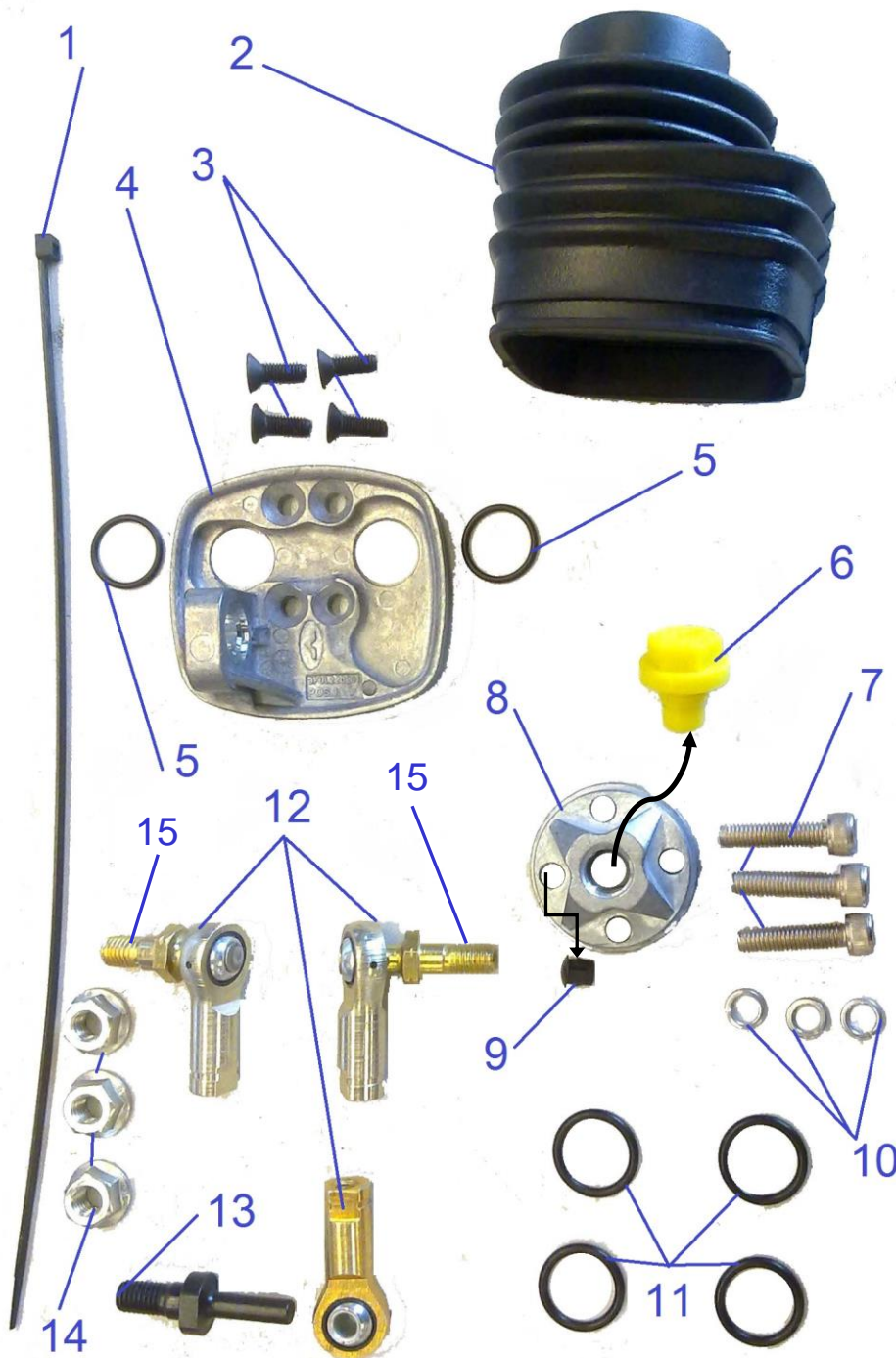
© all rights reserved conform to ISO 16016

	Datum	Name	Benennung	
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Gepr.	2.10.2019	R.Wolff		
			Artikelnummer/Zeichnungsnummer	
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Zust.	Urspr.	EA000071-018	Ers. f.	Ers. d.



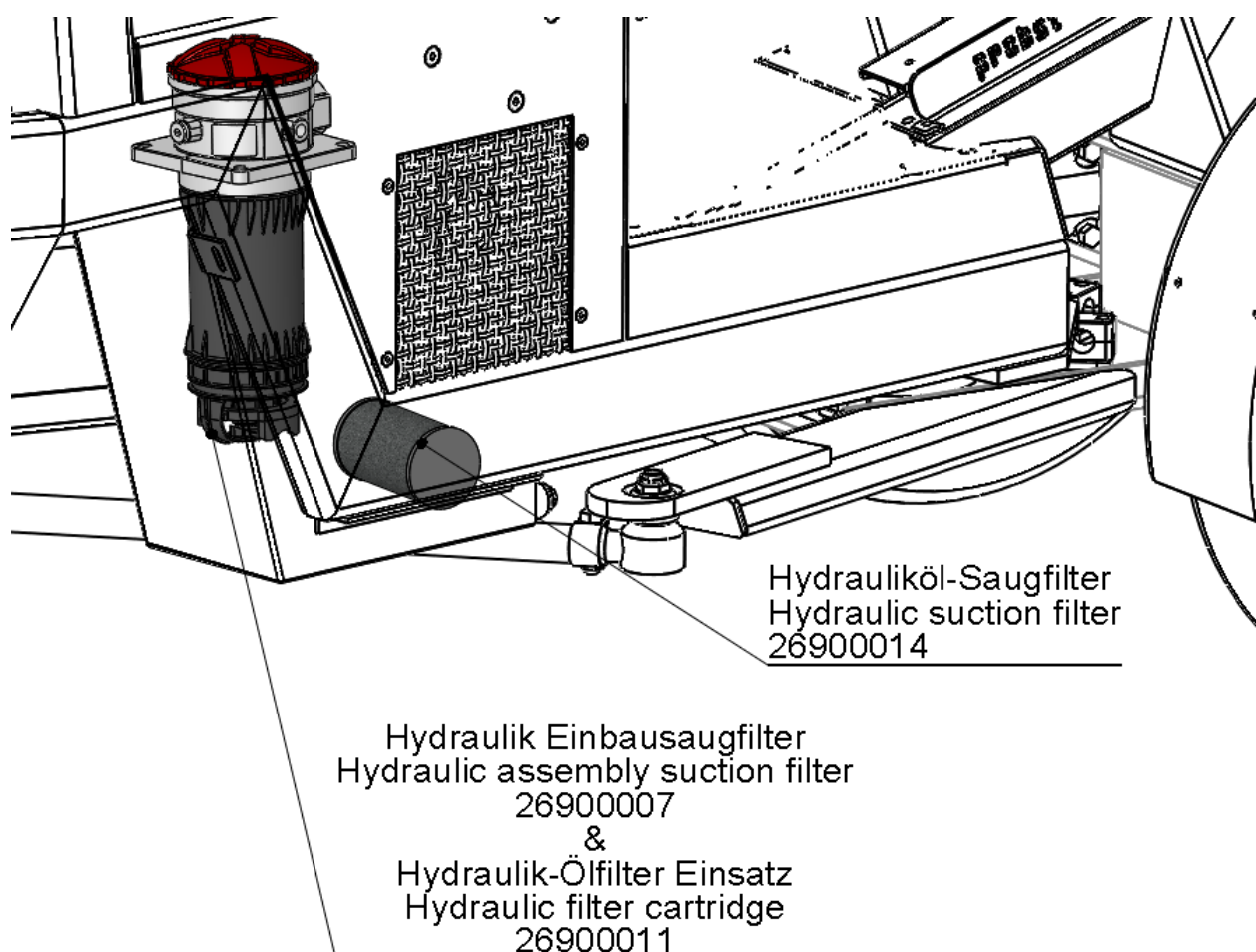
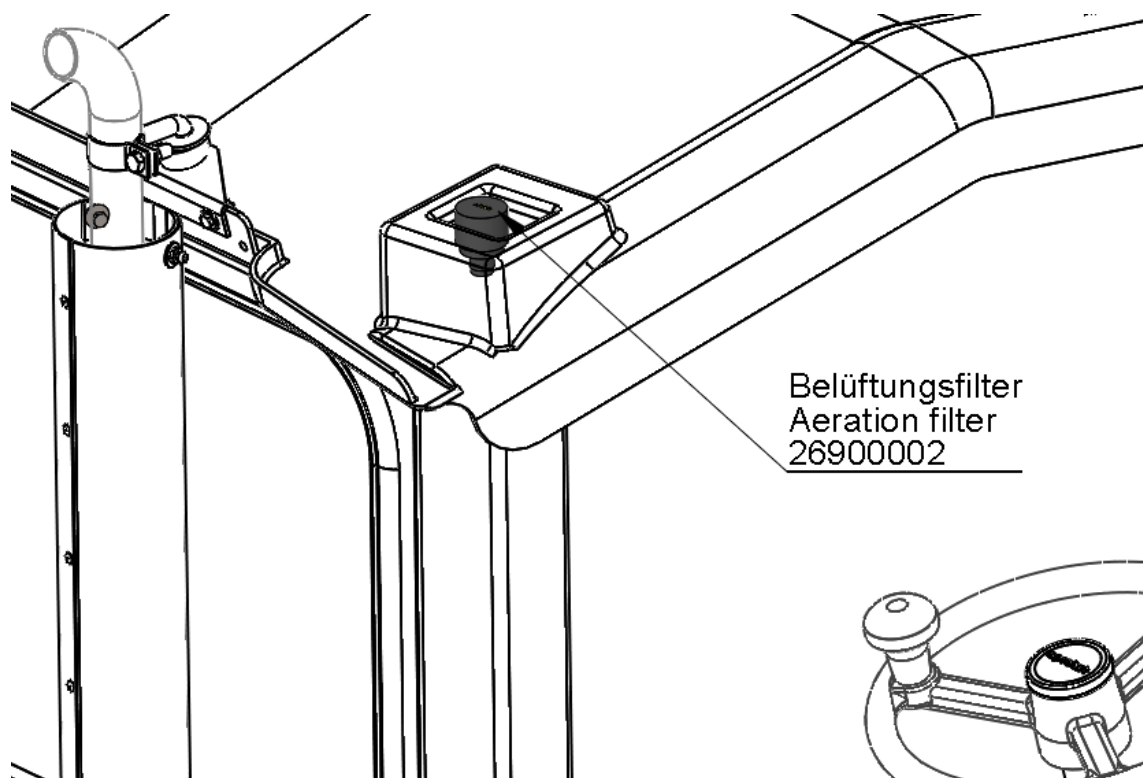
 the better solution		Bei Änderungen Rücksprache TB !			
			Gewicht: 8,1 kg		
		Schutzvermerk nach DIN 34 beachten! Nachdruck nur mit unserer Genehmigung!			
	Datum	Name	Benennung Fensterscheibe hinten rechts, vormontiert, für VM301 (mit Scheibe, Halter und Dichtungen)		
Erst.	6.2.2014	lukas.zannini			
Gepr.					
	WA:	Artikelnummer/Zeichnungsnummer		Blatt 1	
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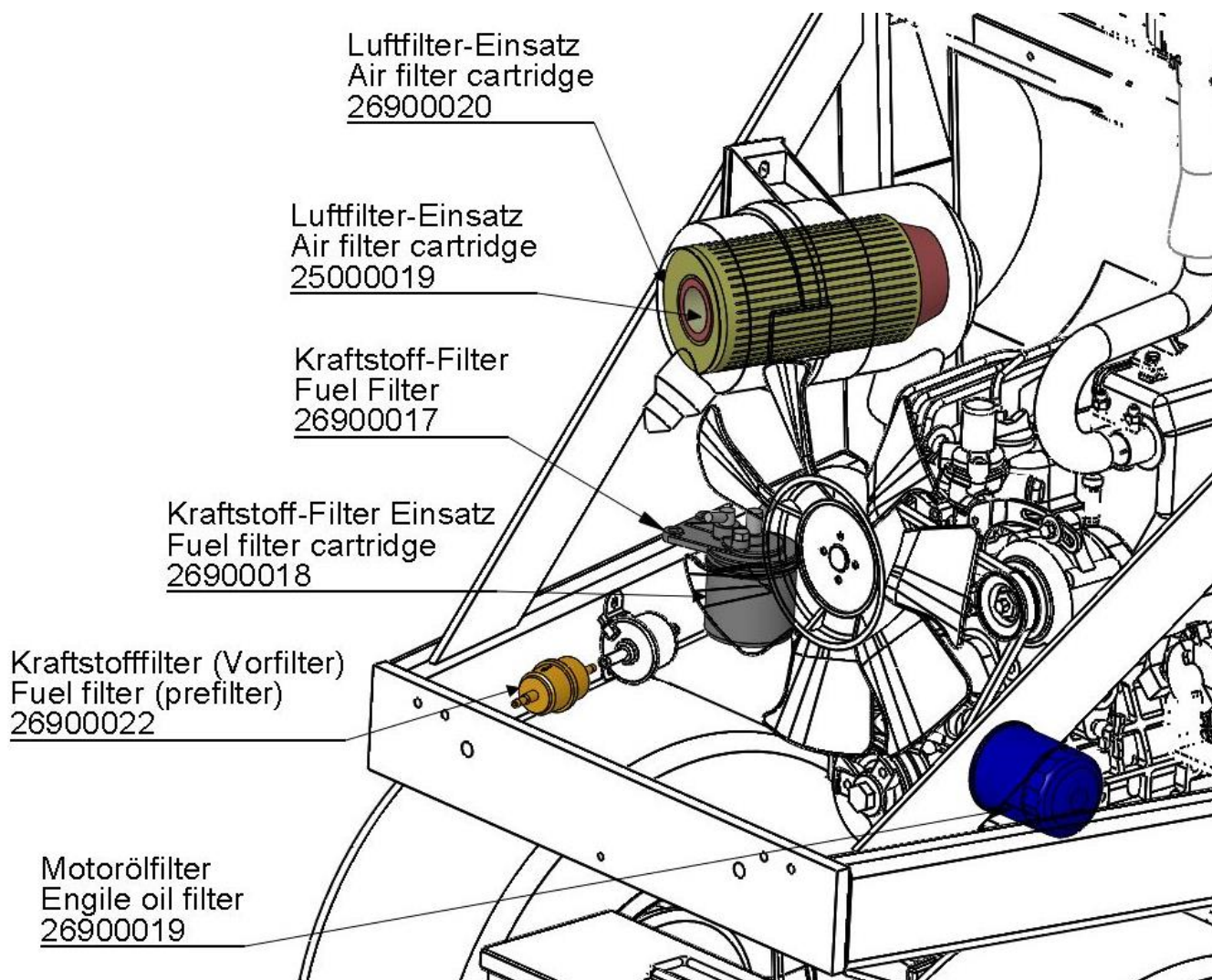
VM-301 /VM-203 Ersatzteile/Spare Parts
Reparatursatz/Repair Set
Kreuzhebelventil/Joystick valve (41600008)



1	24100007 Kabelbinder / Cable fixer
2	21590011 Manschette Manschette (rubber cuff)
3	20040030 Senkkopfschraube (4x) countersunk head screw (4x)
4	22090021 Grundplatte / Base plate
5	21550132 O-Ring (2x) O-Ring seal (2x)
6	00000000 Blindstopfen / Dummy plug
7	20020066 Zylinderkopfschraube (3x) Cylinder head screw (3x)
8	21610007 Halter für Kugelgelenk Holder for ball and socket joint
9	00000000 Blindstopfen / Dummy plug
10	20450004 Federring (3x) Spring washer (3x)
11	21550017 O-Ring (4x) / O-Ring seal (4x)
12	21610006 Kugelgelenk (3x) Ball and socket joint (3x)
13	22090003 Betätigungsnocken Actuating cam
14	20100047 Schraubenmutter (3x) Screw nut (3x)
15	22090007 Haltenocken (2x) Holding cam (2x)

Filterübersicht / Filter overview VM-301 Motor/Engine (D1105)	Art.-Nr.	Hersteller & Bezeichnung Manufacturer&Designation	
Motorölfilter Engine oil filter	26900019	Digöma - D105-BB-EC-1	
Kraftstofffilter(Vorfilter) Fuel filter (prefilter)	26900022	Digöma - KL 63 (LH1)	
Kraftstoff-Filter-Einsatz Fuel filter cartridge	26900018	Digöma - DGM/K03185	
Hydraulik-Ölfilter-Einsatz Hydraulic filter cartridge	26900011	Digöma - DGM/H 2301	
Luftfilter-Einsatz Air filter cartridge	26900020	Digöma - 4510057104	
BelüftungsfILTER Aeration filter	26900002	Fritz Stiefel GmbH	
VM203: Hydrauliköl-Saugfilter (lang) Hydraulic suction filter (long) VM204: Hydrauliköl-Saugfilter (kurz) Hydraulic suction filter (short)	26900014 26900010	Argo – AS 040-01K Argo – 0 007 002	
Hydrauliköl-Einbausaugfilter Hydraulic assembly suction filter	26900007	Argo – ES 074-6120	
Luft-Filter-Einsatz Air filter cartridge	25000019	ELSÄSSER – CF 100	
Kraftstoff-Filter Fuel filter	26900017	ELSÄSSER – C1112	



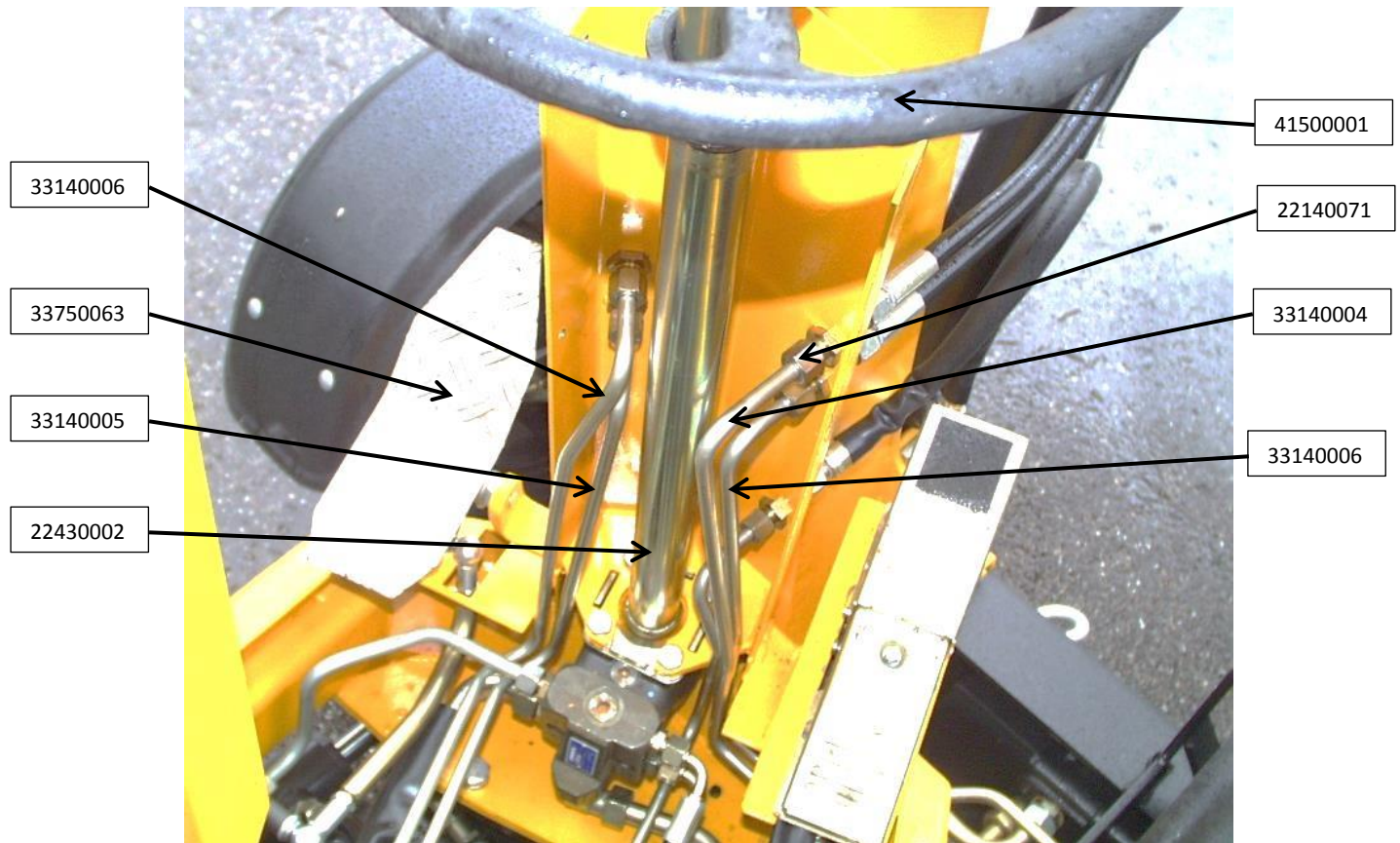


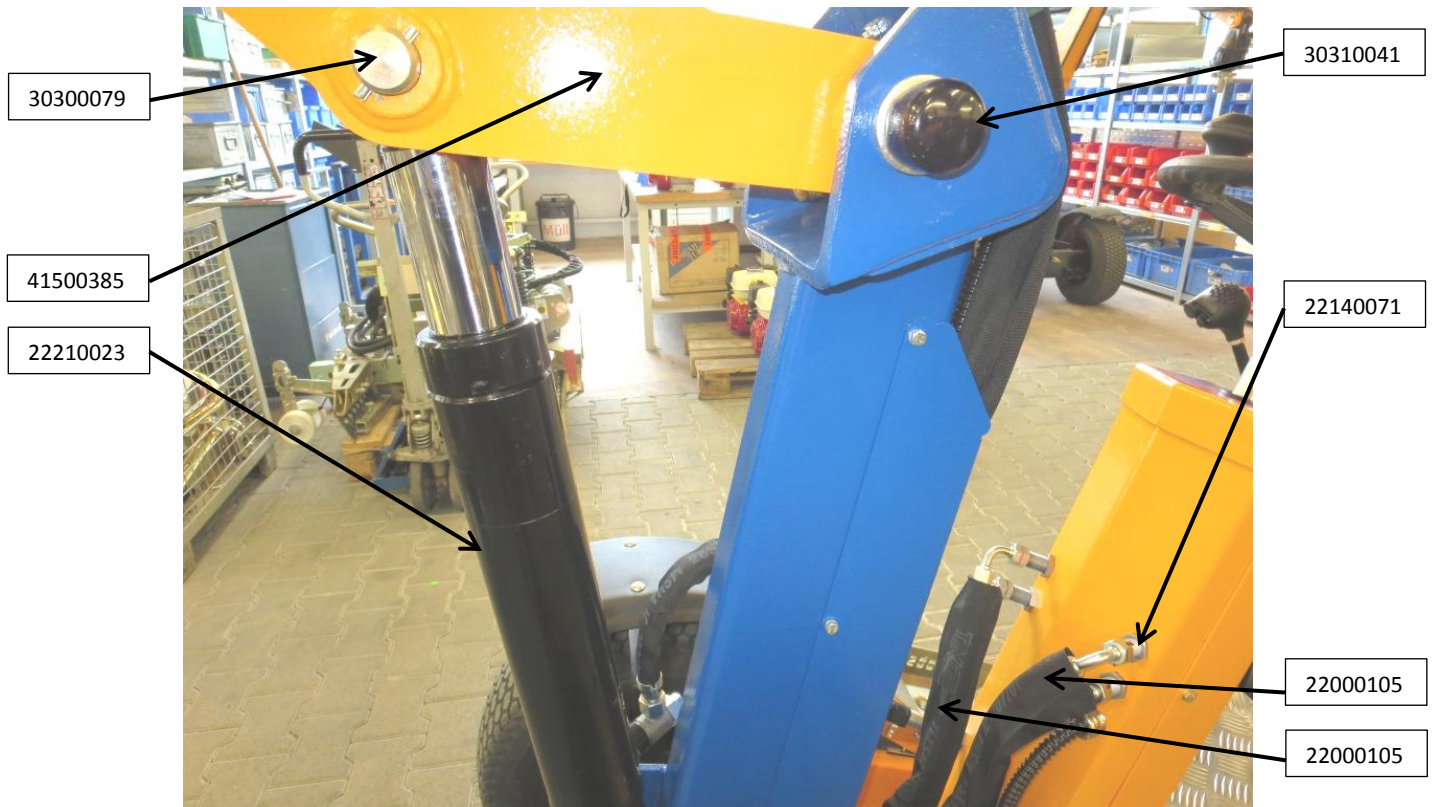


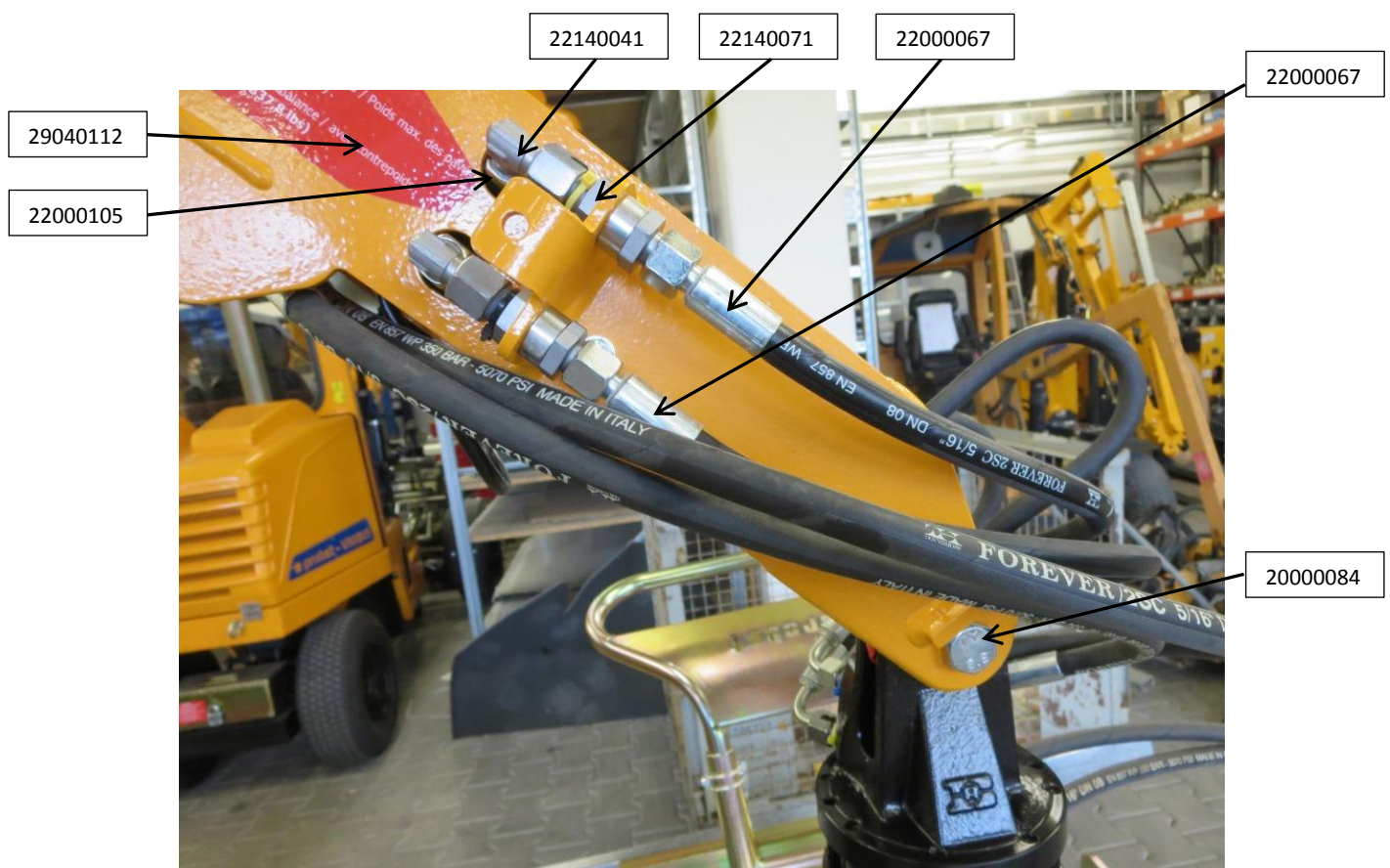
VM-301-PAVERMAX (5150.0020 / 5150.0022)

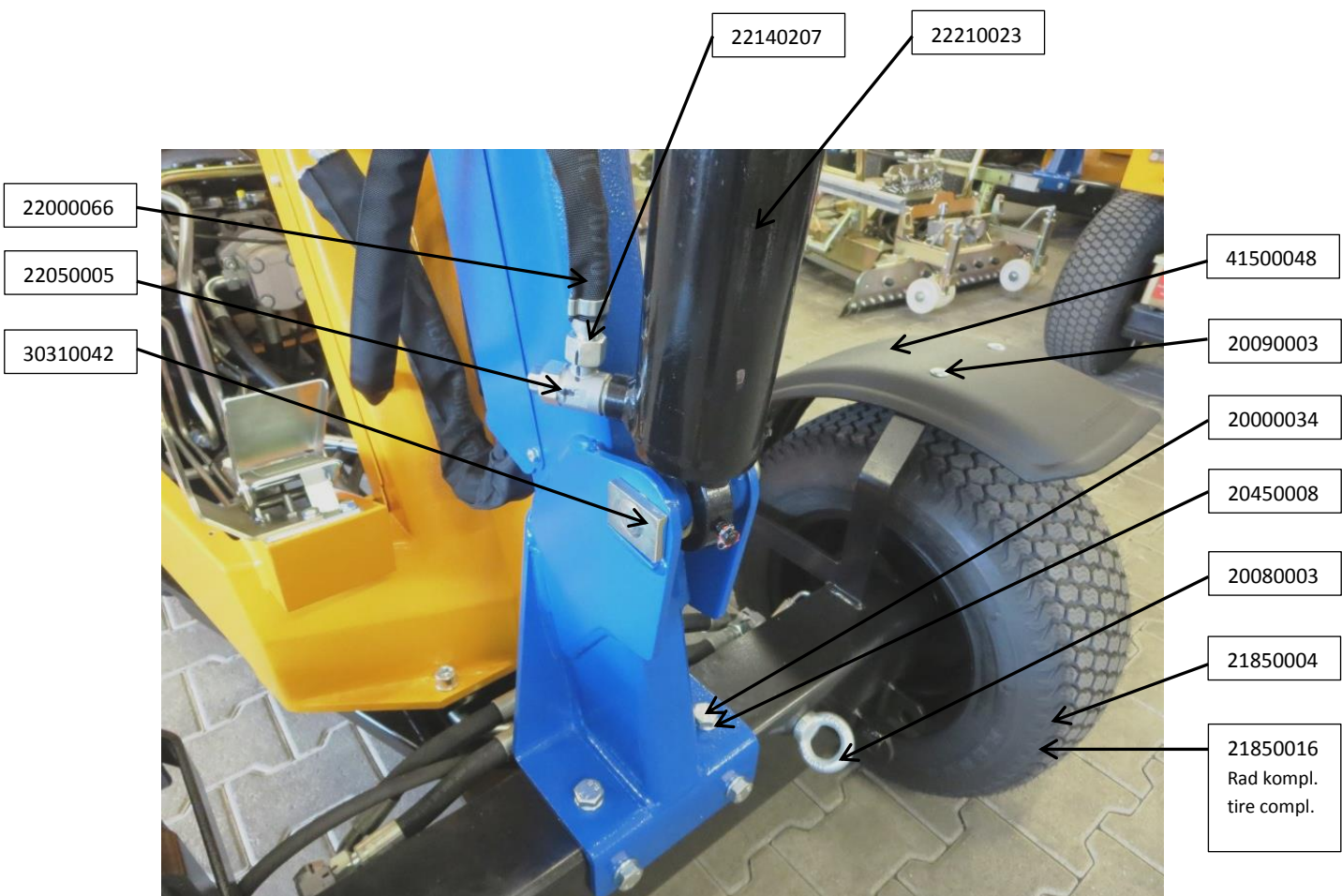


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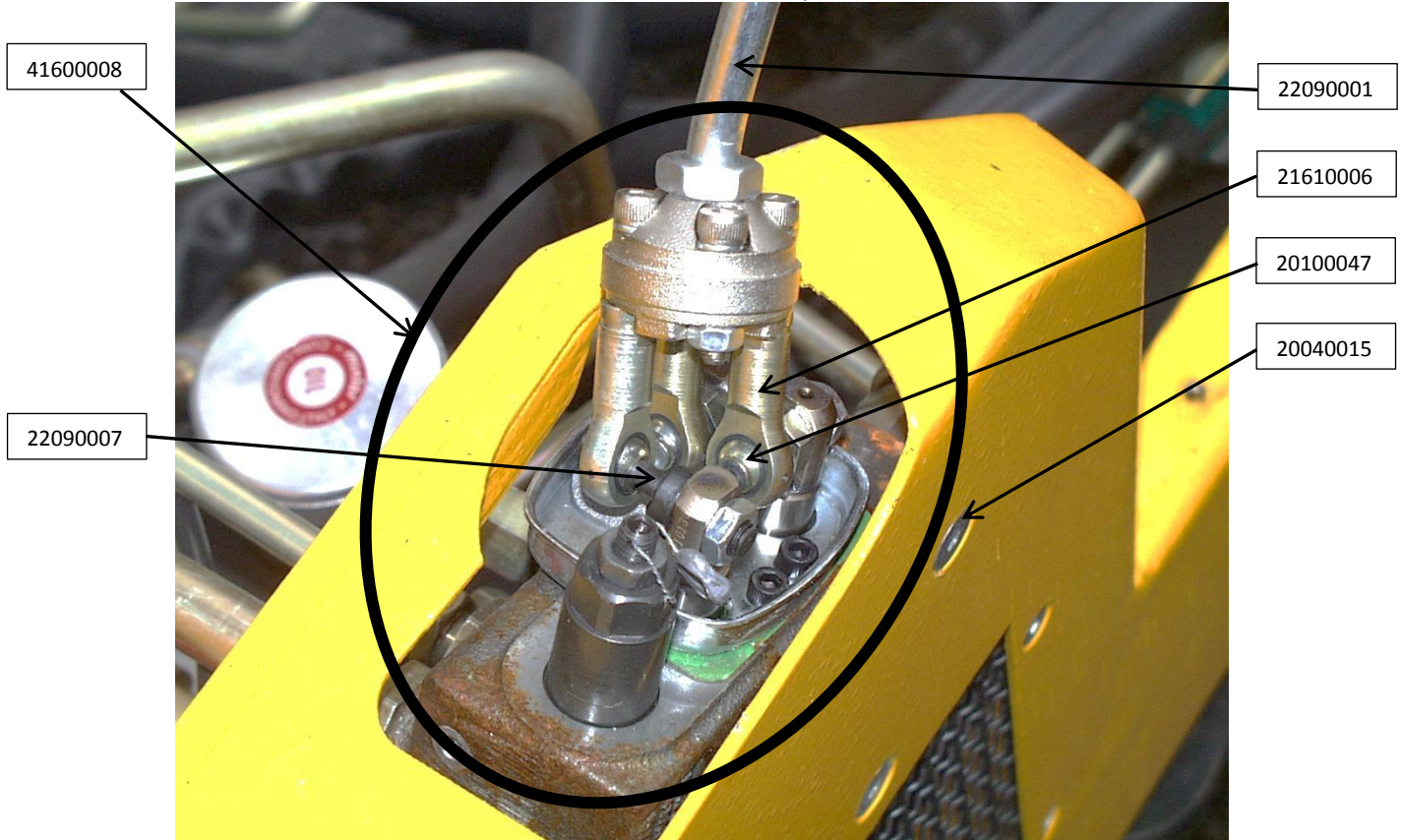


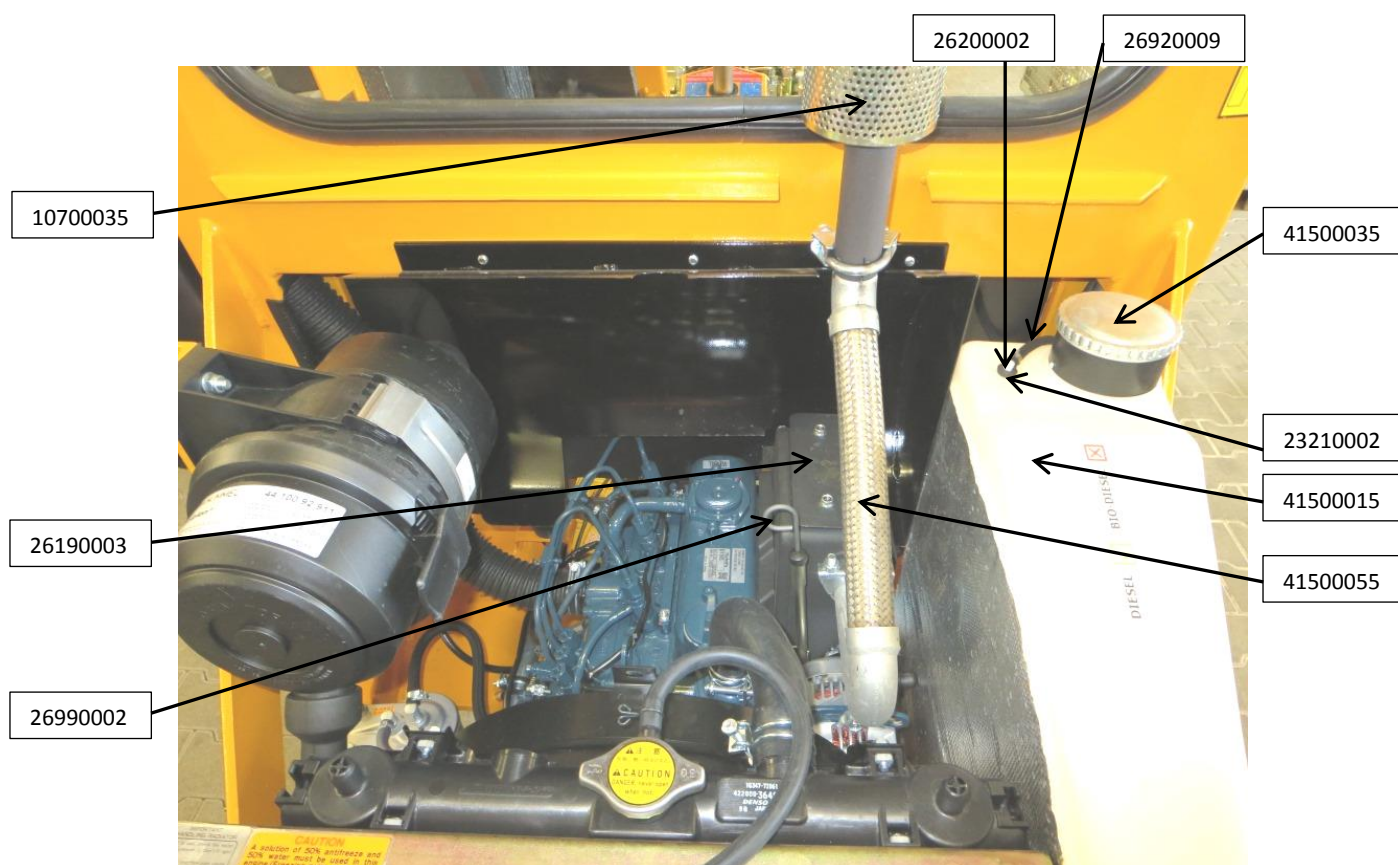
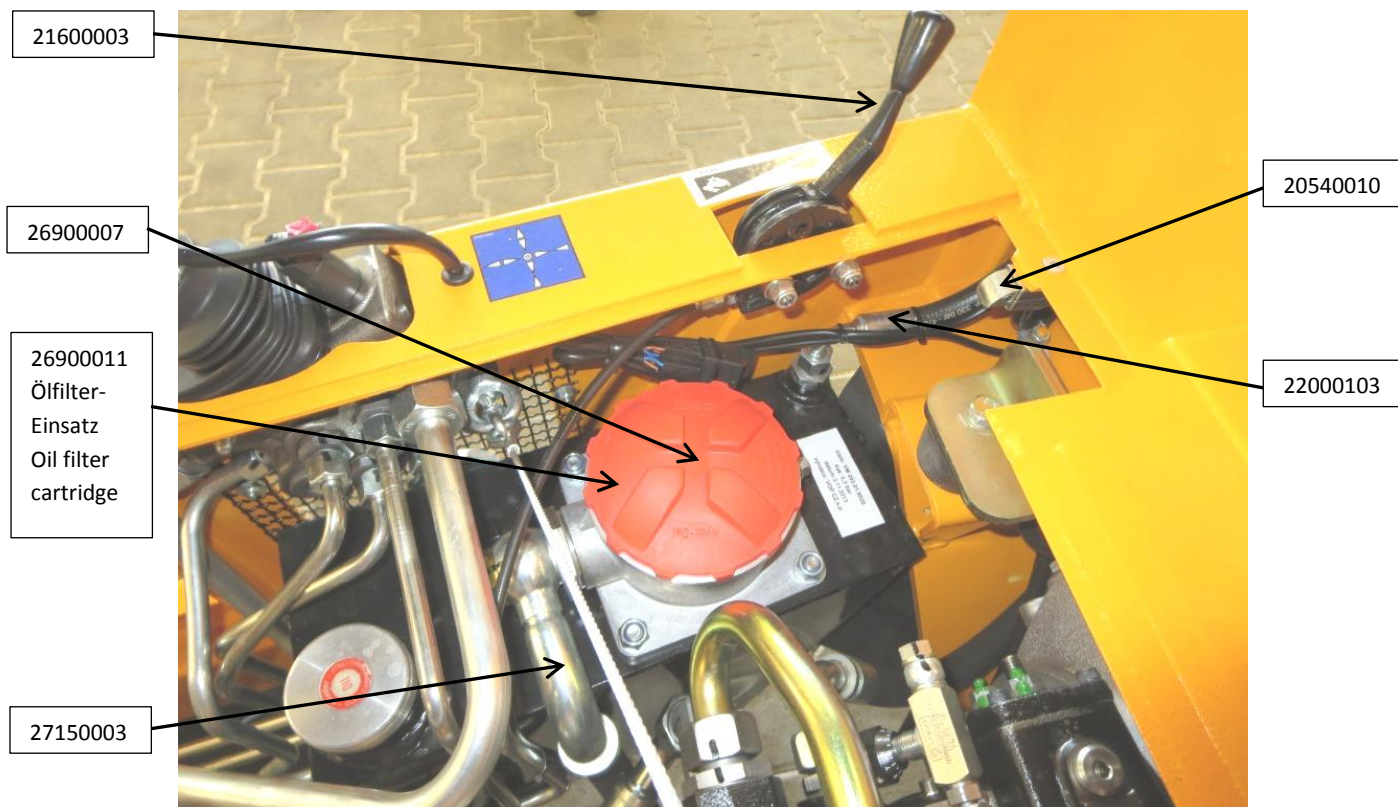


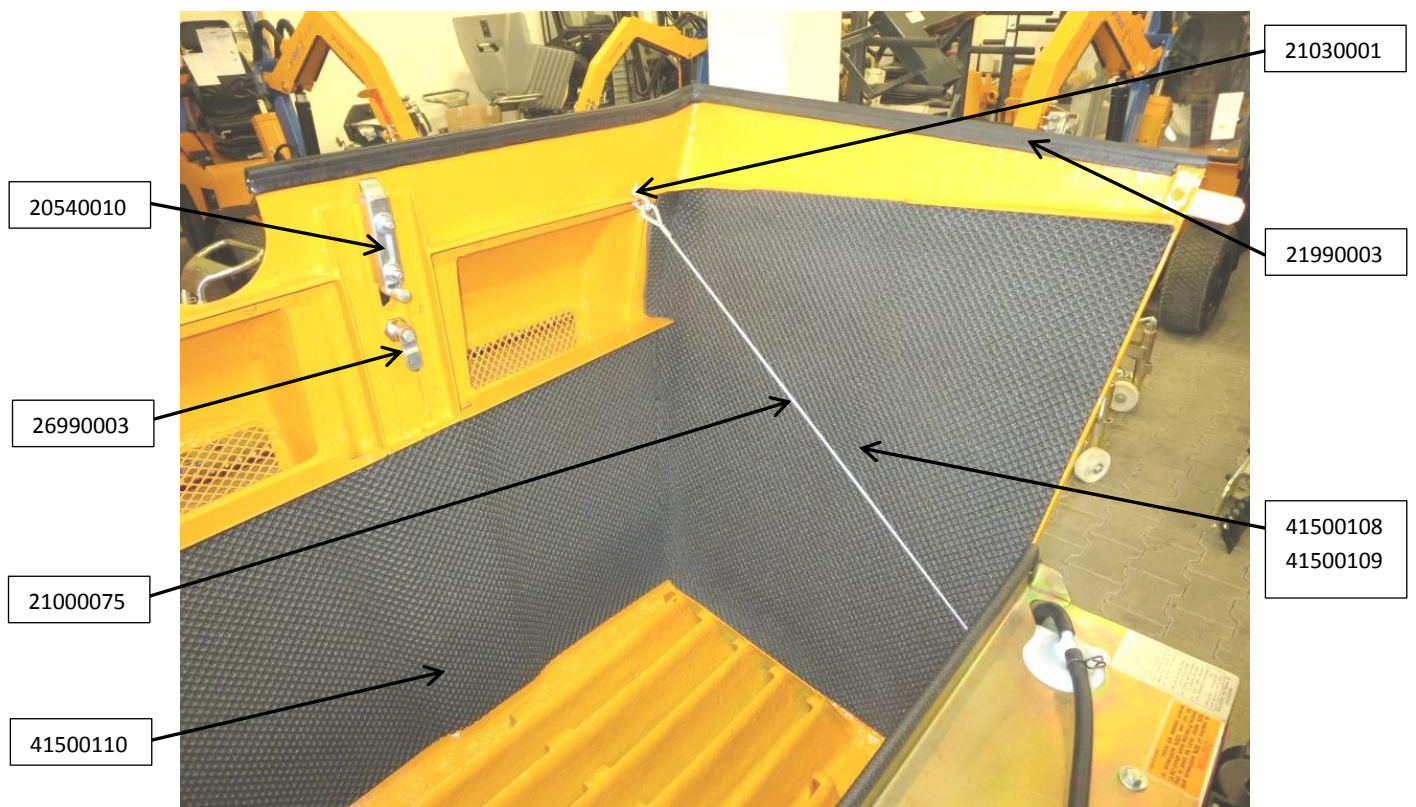
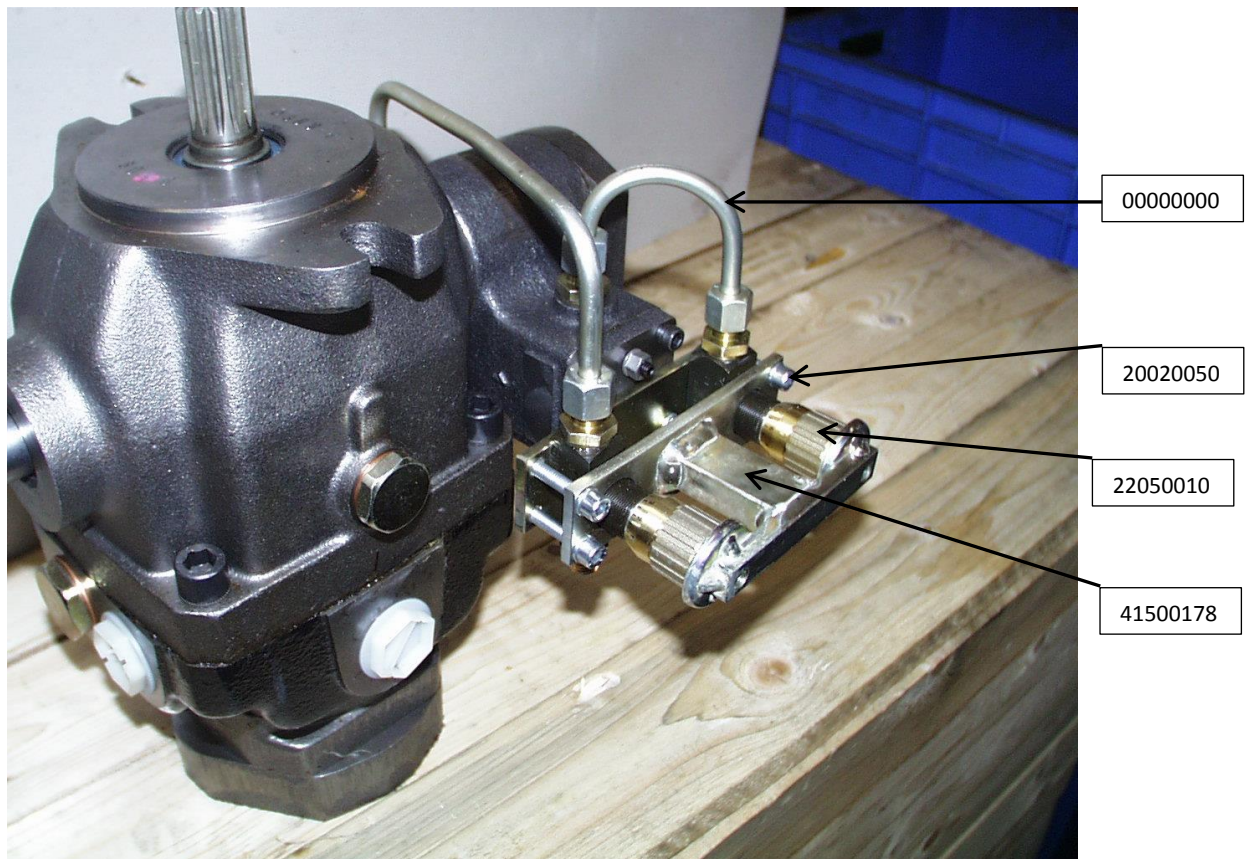




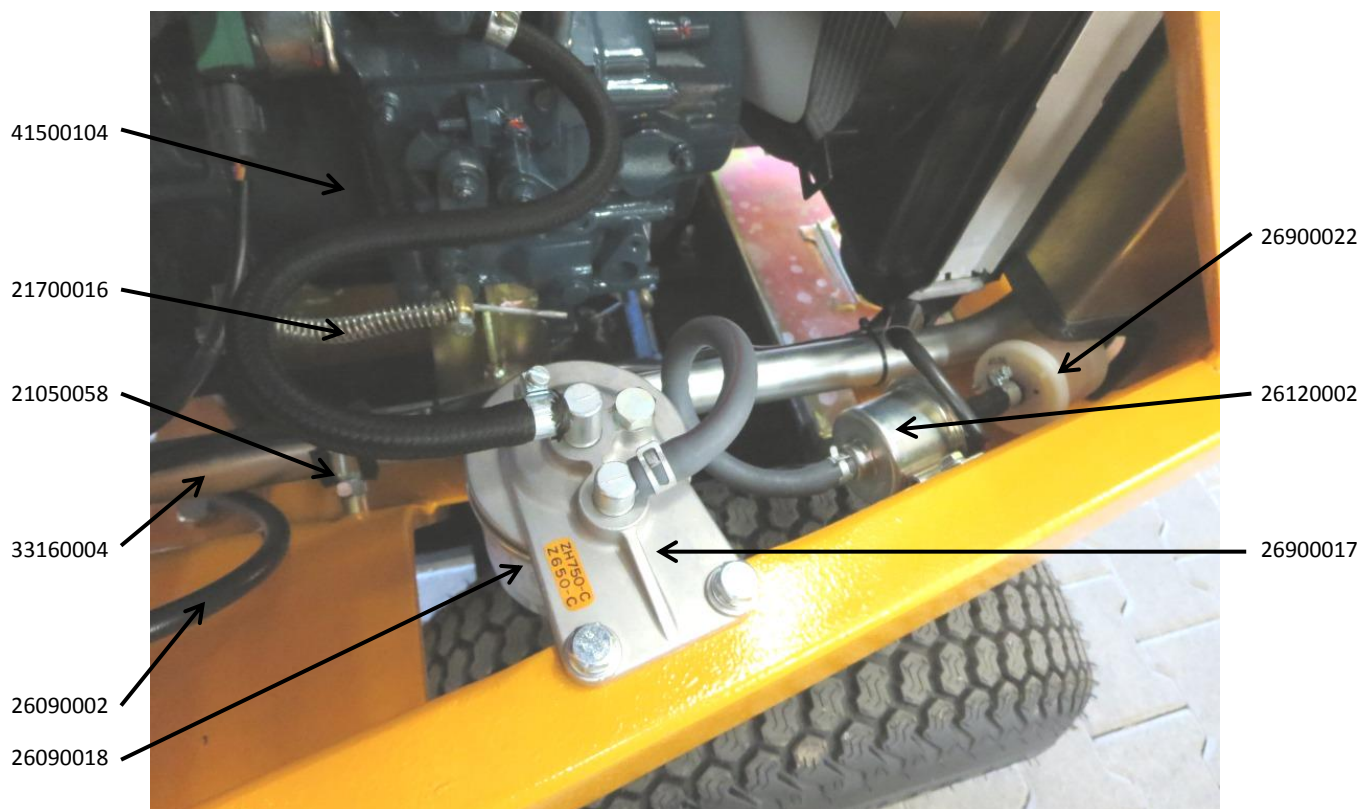
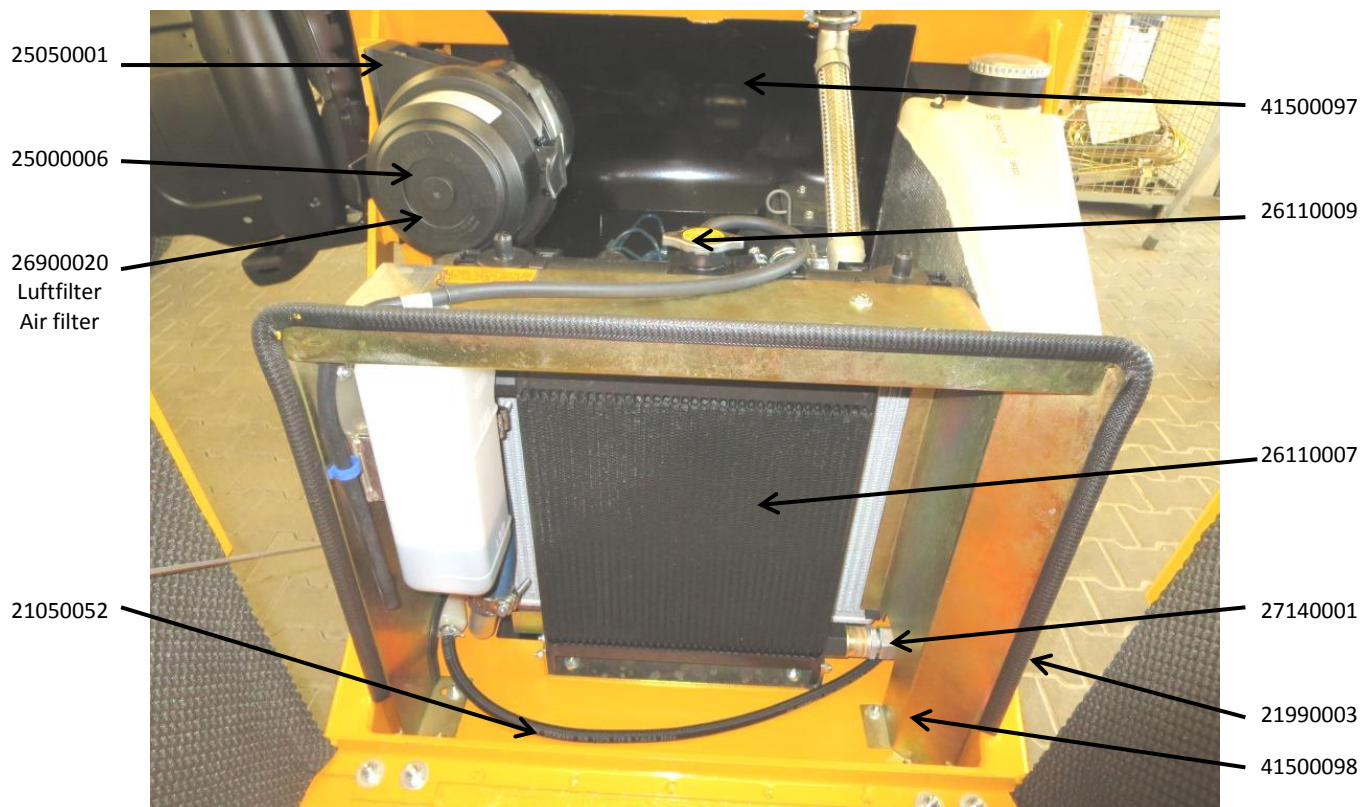
aktuelles Bild fehlt noch siehe → hier Bsp. Bild von VM-203

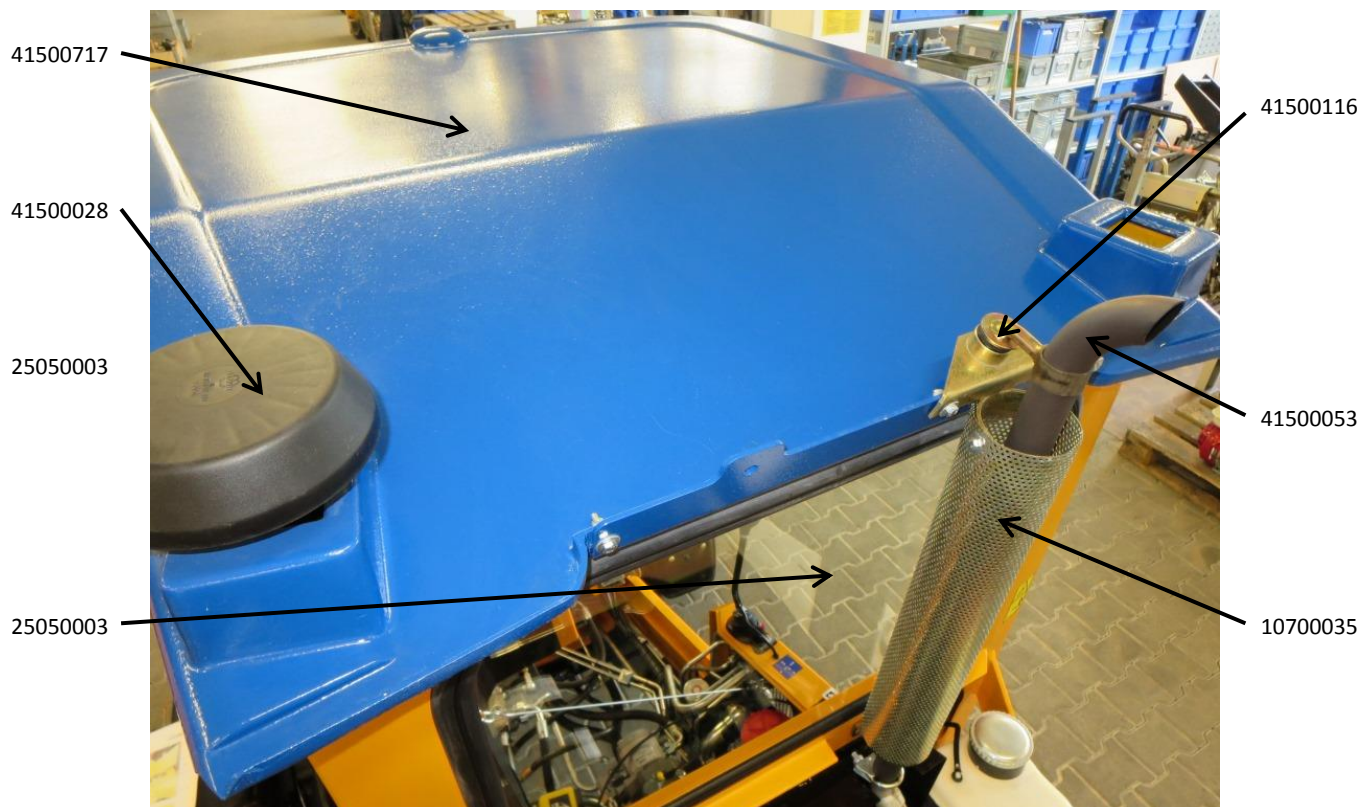




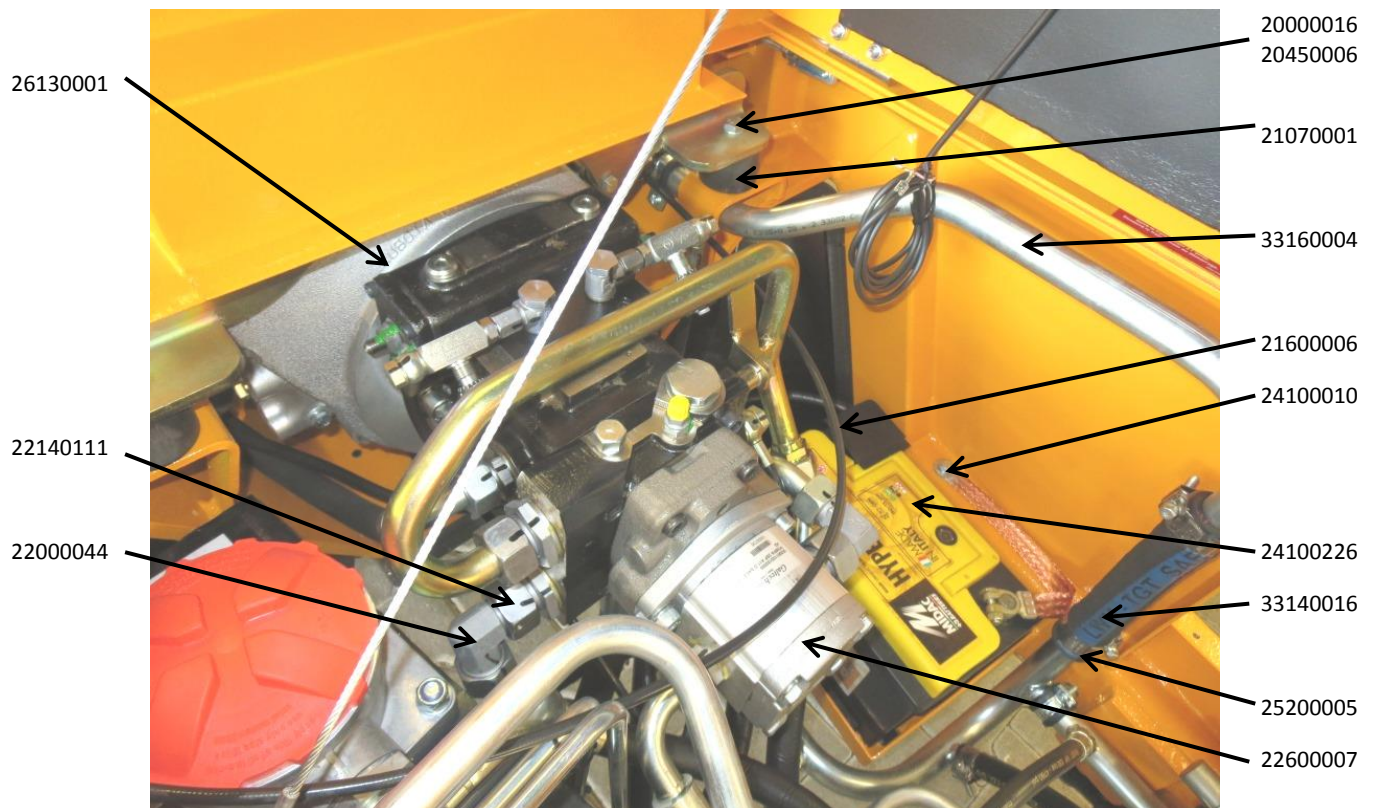
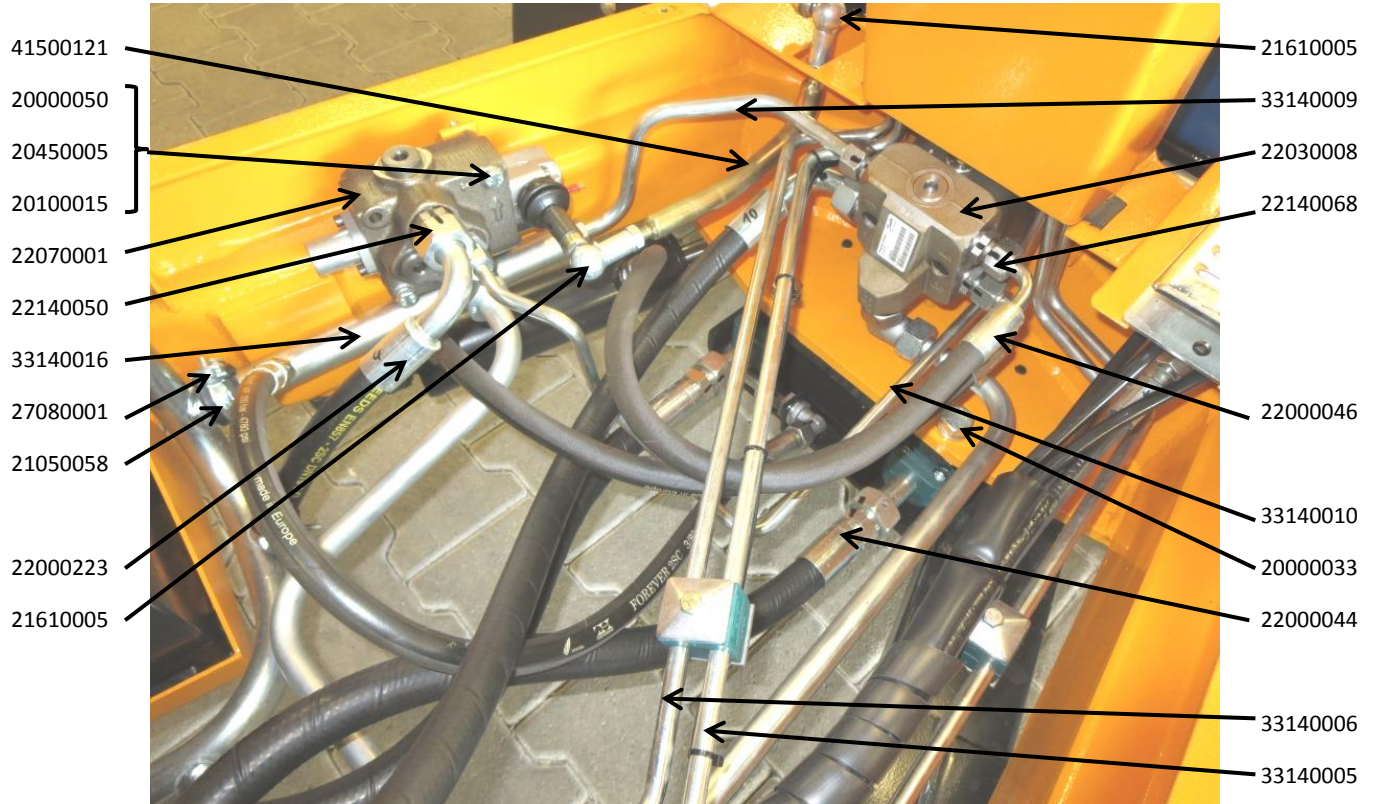






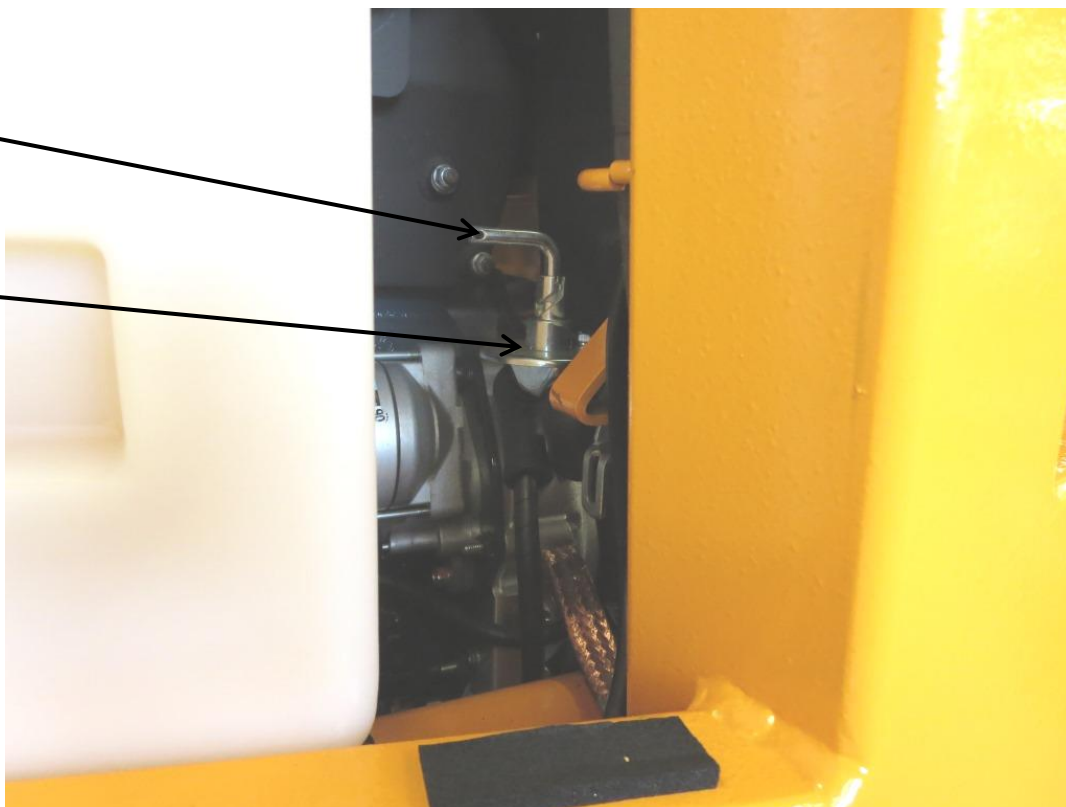






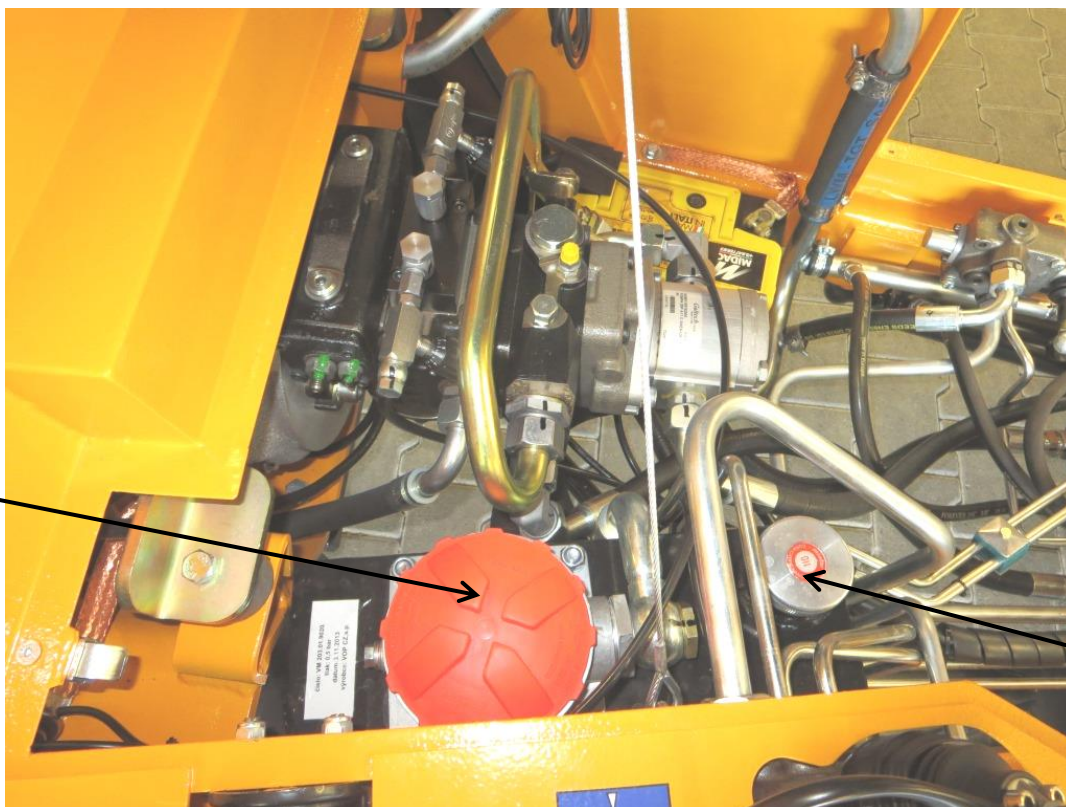
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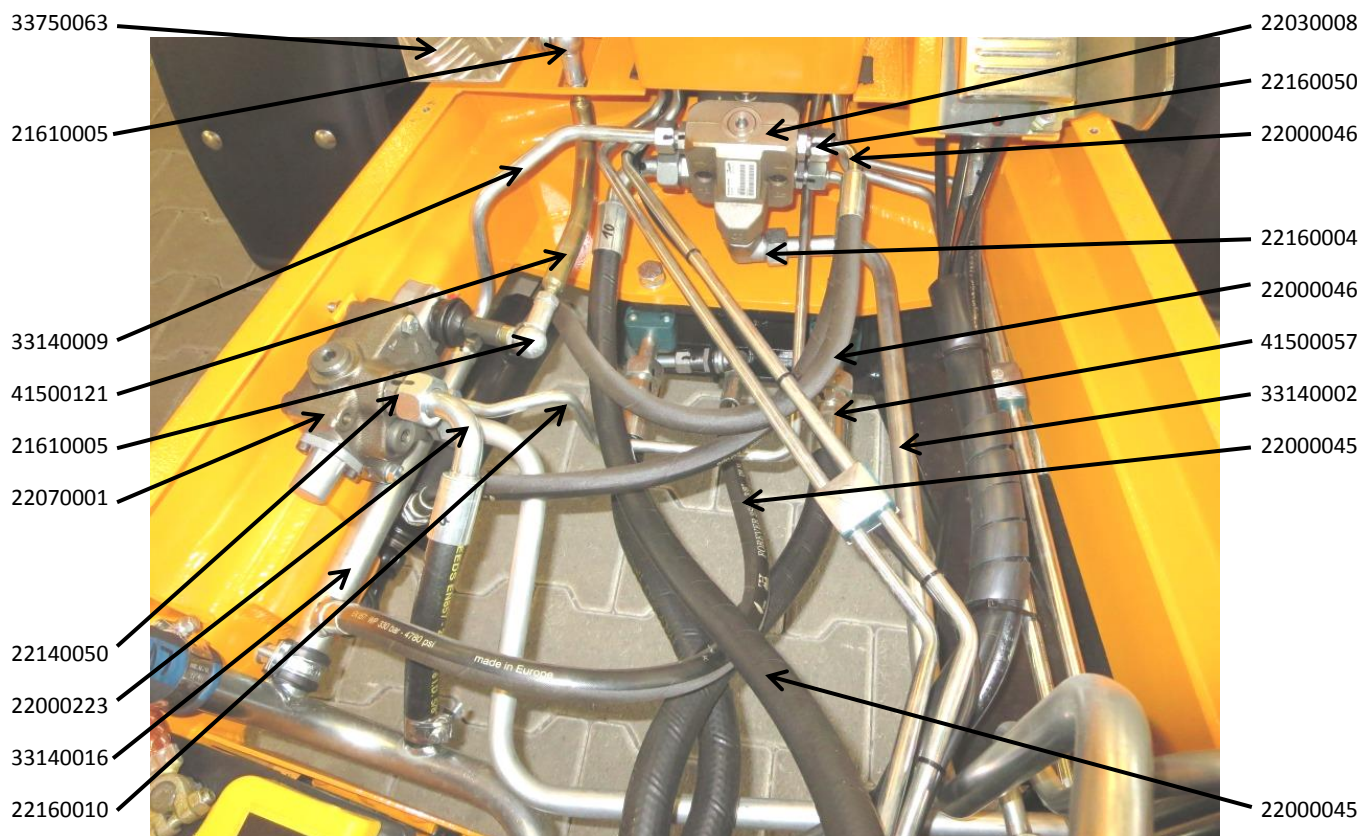
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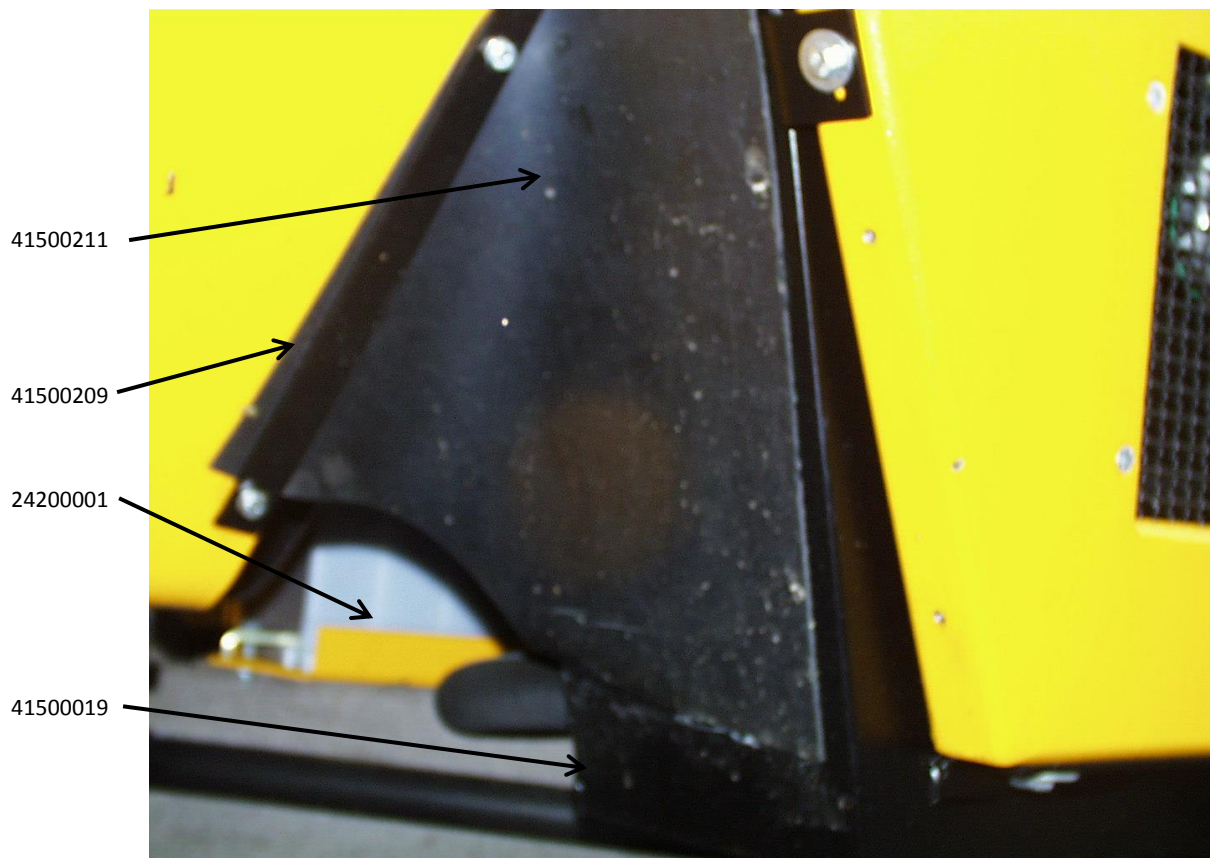


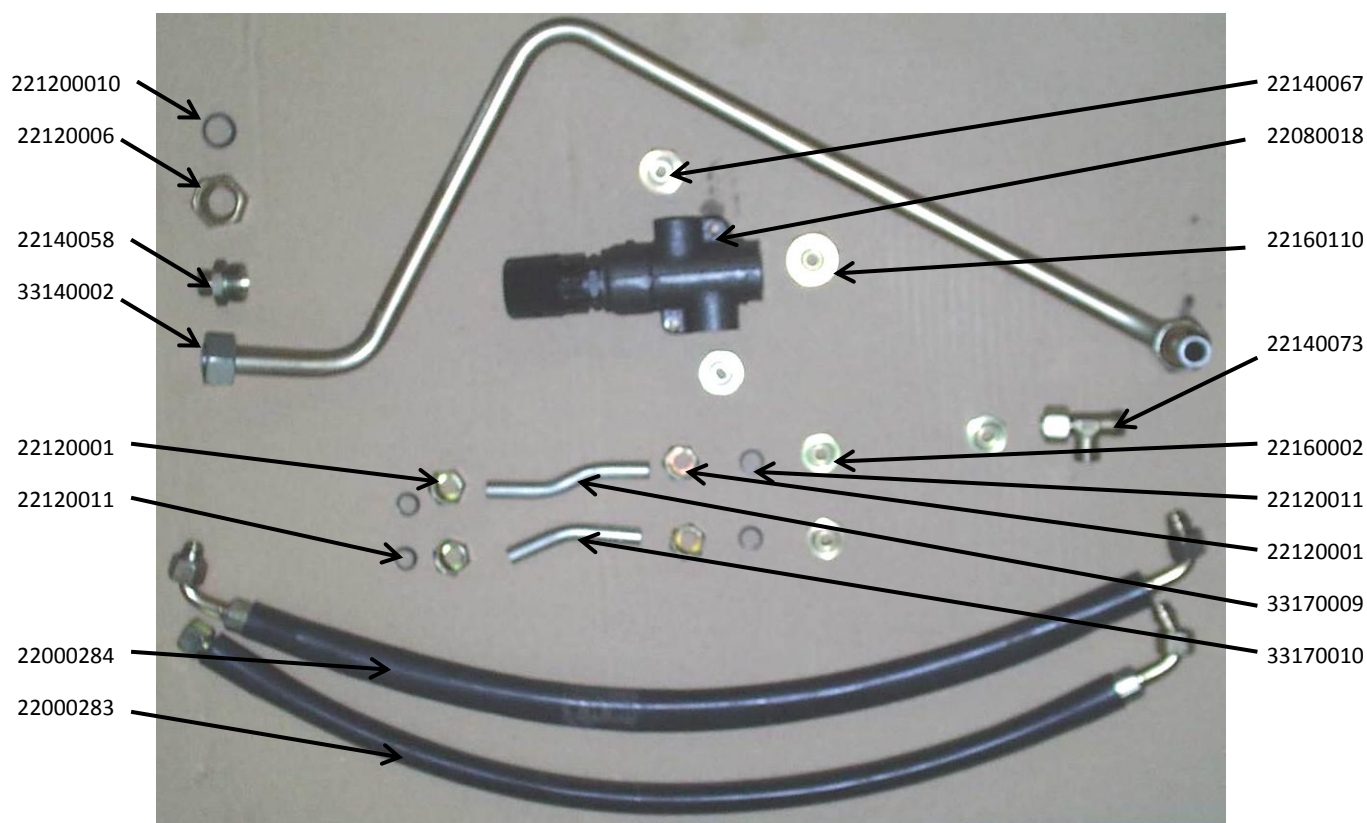
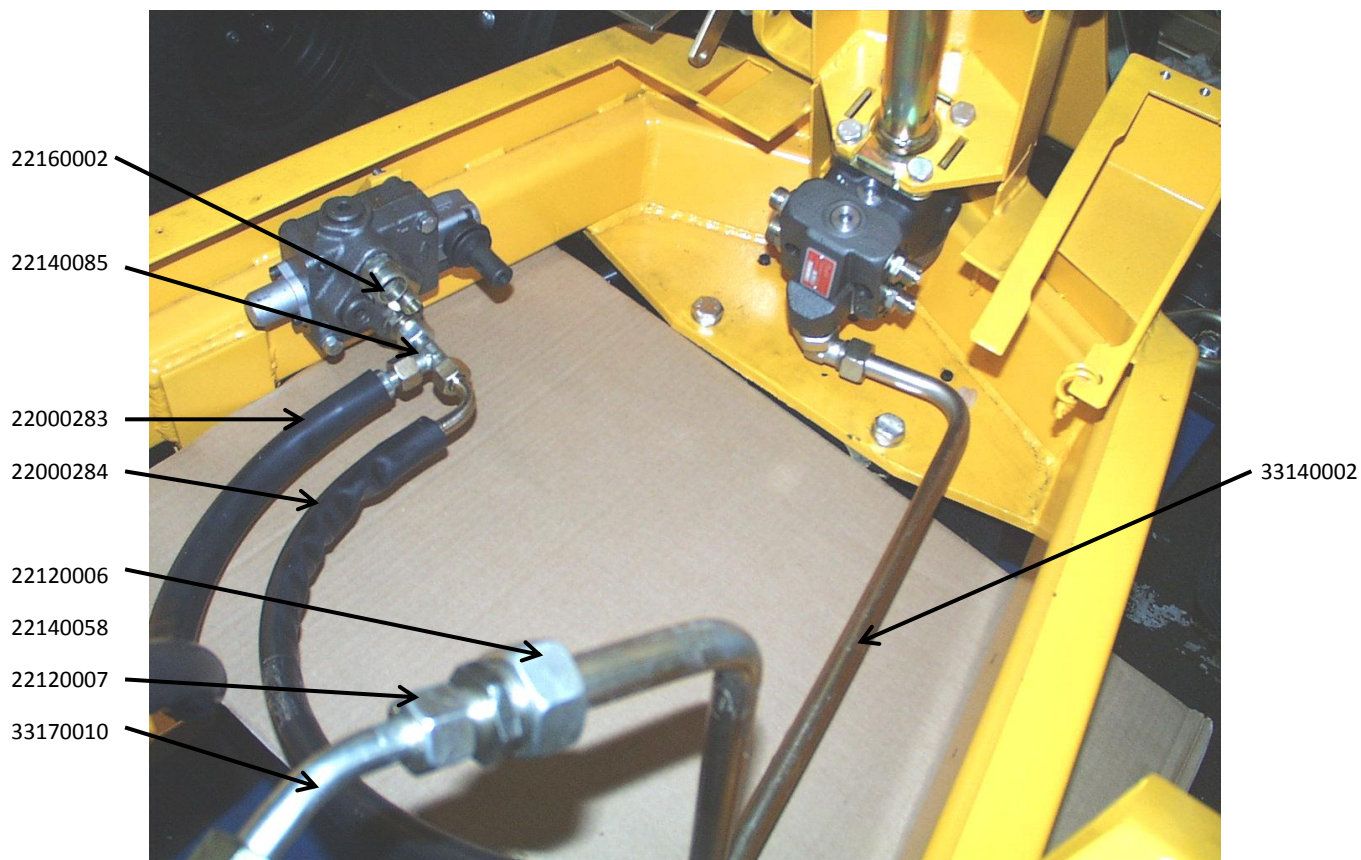
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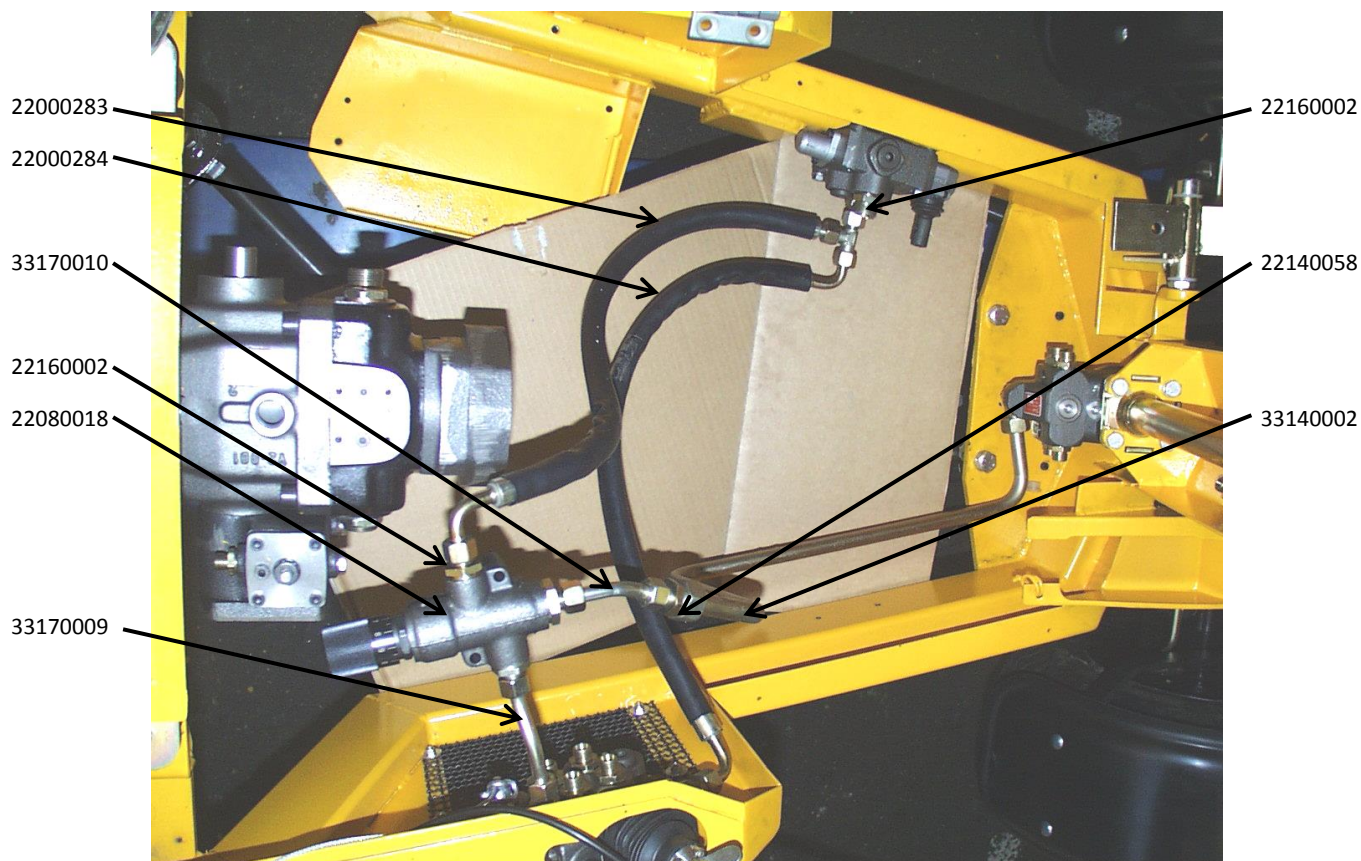
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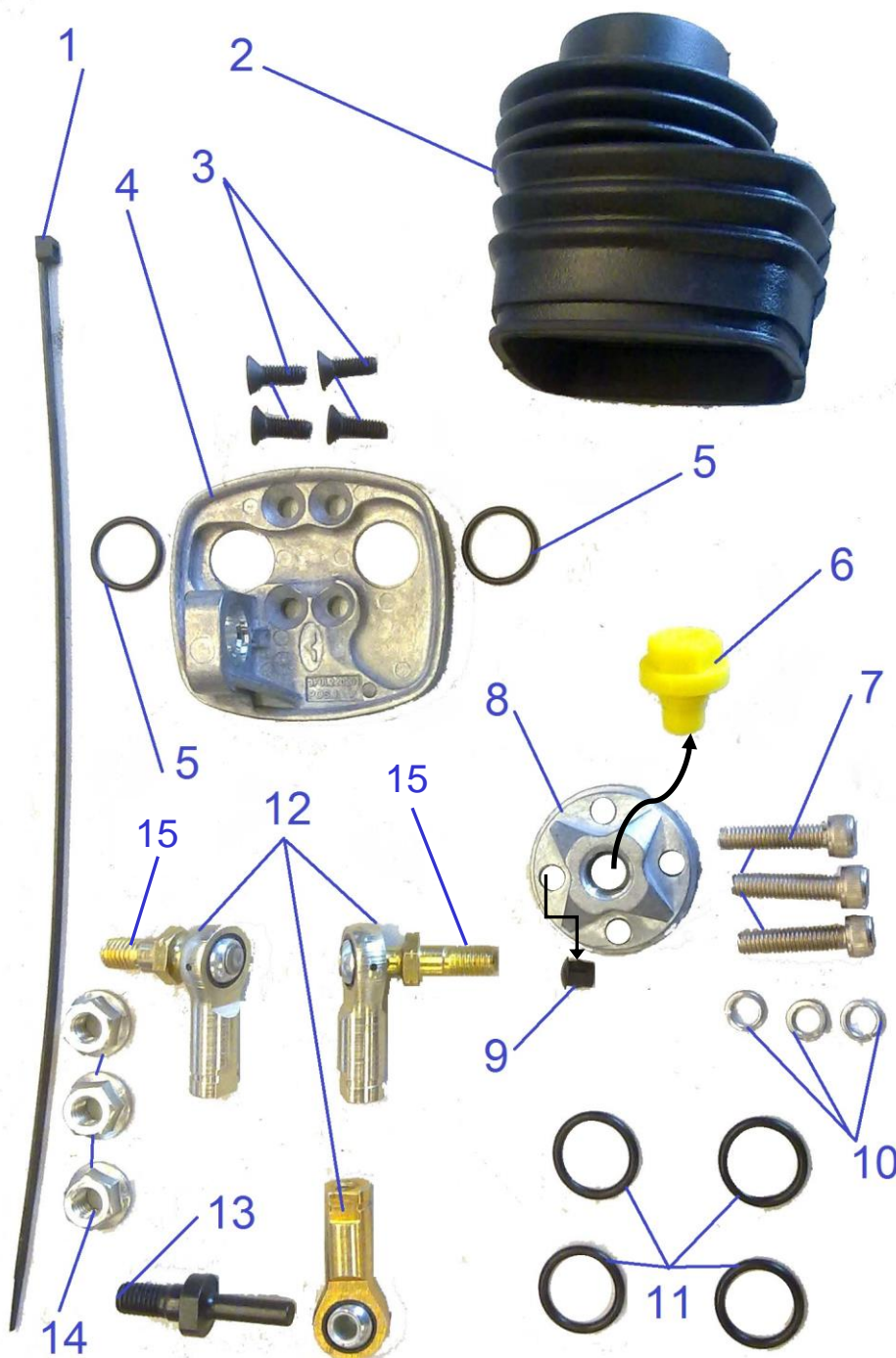






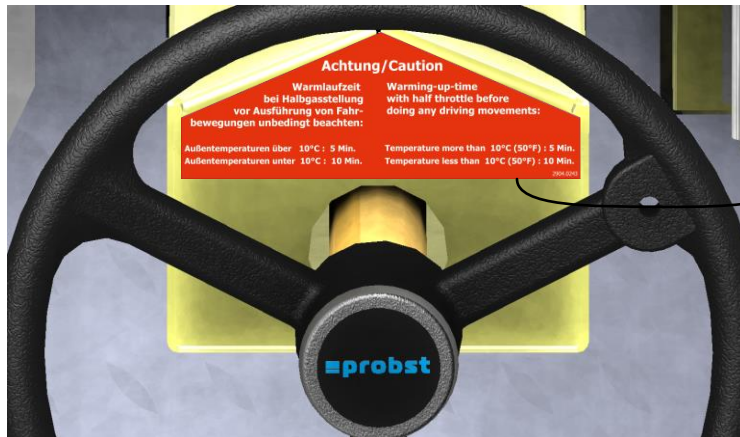


VM-301 /VM-203 Ersatzteile/Spare Parts
Reparatursatz/Repair Set
Kreuzhebelventil/Joystick valve (41600008)



1	24100007 Kabelbinder / Cable fixer
2	21590011 Manschette Manschette (rubber cuff)
3	20040030 Senkkopfschraube (4x) countersunk head screw (4x)
4	22090021 Grundplatte / Base plate
5	21550132 O-Ring (2x) O-Ring seal (2x)
6	00000000 Blindstopfen / Dummy plug
7	20020066 Zylinderkopfschraube (3x) Cylinder head screw (3x)
8	21610007 Halter für Kugelgelenk Holder for ball and socket joint
9	00000000 Blindstopfen / Dummy plug
10	20450004 Federring (3x) Spring washer (3x)
11	21550017 O-Ring (4x) / O-Ring seal (4x)
12	21610006 Kugelgelenk (3x) Ball and socket joint (3x)
13	22090003 Betätigungsnocken Actuating cam
14	20100047 Schraubenmutter (3x) Screw nut (3x)
15	22090007 Haltenocken (2x) Holding cam (2x)

Beklebt von probst



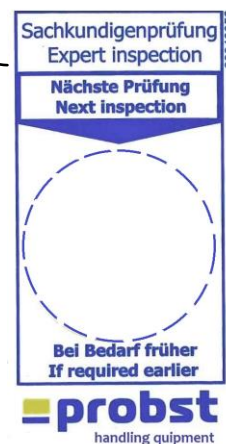
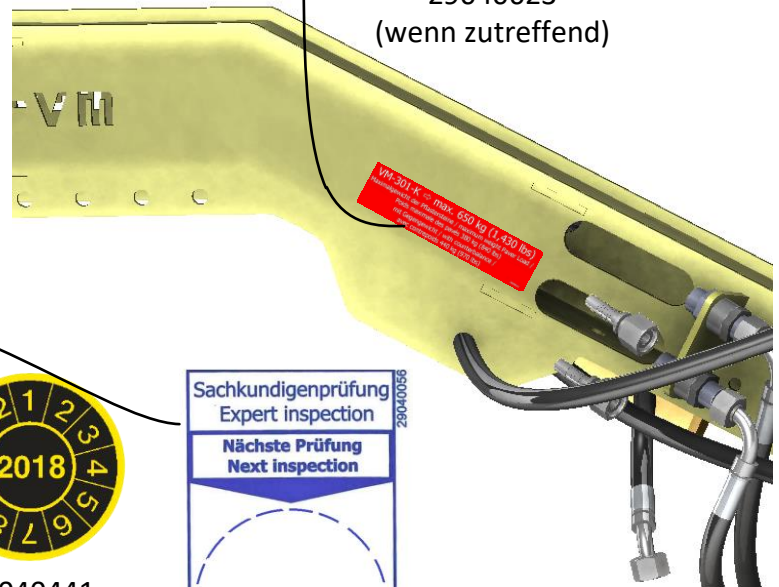
29040243 (DE/GB)
29040314 (DE/FR)

VM-301-K ⇔ max. 650 kg (1,430 lbs)
Maximalgewicht der Pflastersteine / maximum weight Paver Load /
Poids maximale des pavés 380 kg (840 lbs)
mit Gegengewicht / with counterbalance /
avec contrepoids 440 kg (970 lbs)

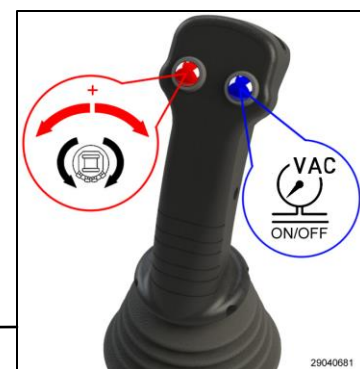
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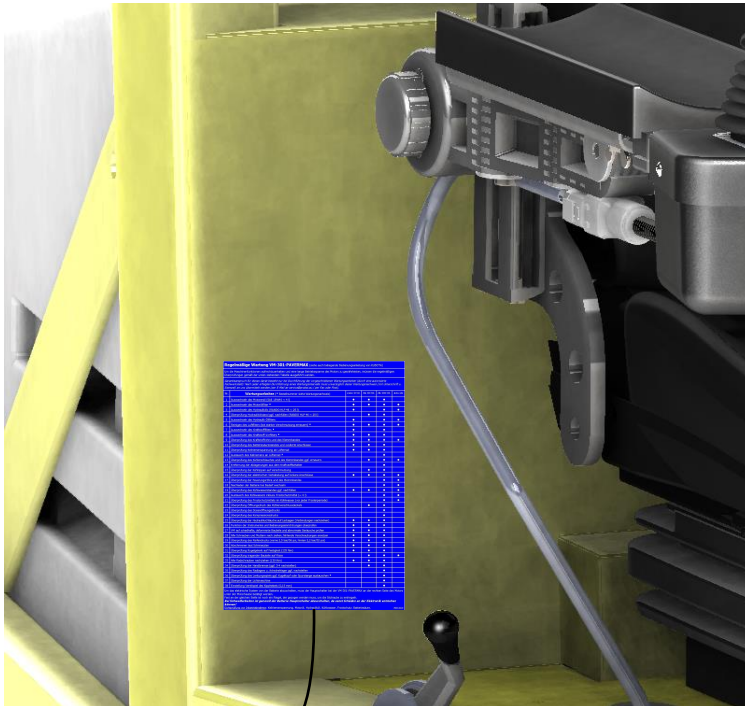


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29040681
(wenn zutreffend)

Beklebt von probst



Operating Instructions for Paver Max VM-301 / VM-301-K

I General

- Maximum weight of the paving stones:
 - without counterbalance: 320 kg (705 lbs) → VM-301 / 380 kg (840 lbs) → VM-301-K
 - with counterbalance: 380 kg (840 lbs) → VM-301 / 440 kg (970 lbs) → VM-301-K
- Driving speed shall not exceed walking speed (3.5 mph),
 - when the lift arm is lifted more than 50 cm (20 inch) above the ground,
 - when the VM-301-PAVERMAX is on a more than 10 degree slant,
 - when no equipment (e.g. HVZ) is attached.
- Driving speed around curves and uneven terrain is not to exceed 7 km/h (4.3 mph), about 1/3 of max. speed.
- Caution do not:
 - open the hood while the engine is running,
 - work on the electric system without disconnecting the battery,
 - leave the machine the motor running,
 - go near or under a suspended load.
- To adjust the height of the driver's seat just lift the seat up by hand a little bit. It will lock automatically in three positions. Reaching the top position it will automatically go down to the lowest position.
- Warming-up-time with half throttle before doing any driving movements:
 - Temperature more than 10°C (41°F): 5 Min.
 - Temperature less than 10°C (50°F): 10 Min.

II Operating the hydraulic installation clamp HVZ/HVZ-UNI

- Position the open clamp over the stone package, lower the clamp until it lays flat on the top of the stone layer. The clamp fingers on the machine side should be touching the side of stones.
- Closing the side clamps by moving the 4-way hydraulic control lever to the left. This lever is located to the right of the driver's seat.
- Close the main clamps by moving the control lever to the rear until the oil pressure gauge on the installation clamp reads 150 bar.
- Lift the installation clamp with the gripped stone layer for about ~ 10 cm (4").
- Drive to the installation site.
- Open the side clamps by moving the control lever outwards.
- Position the stone layer against the installed pavers and open the main clamps by moving the control lever towards the front.
- Pick up the installation clamp assembly and begin a new cycle.

Note the detailed operating instructions!

29040613

29040613 (DE)
29040614 (GB)
29040615 (FR)

Regelmäßige Wartung VM-301-PAVERMAX (siehe auch beiliegende Bedienungsanleitung von KUBOTA)

Um die Maschinenfunktionen aufrechtzuerhalten und eine lange Betriebsdauer des Motors zu gewährleisten, müssen die regelmäßigen Überprüfungen gemäß der unten stehenden Tabelle durchgeführt werden.

Gründemerkmal für diese Arbeit besteht nur bei Durchführung der vorgeschriebenen Wartungsarbeiten (durch eine autorisierte Fachwerkstatt). Nach jeder erfolgreichen Durchführung eines Wartungsintervalls muss unverzüglich dieser Wartungscheck (mit Unterschrift, Datum) an uns übermittelt werden (per Fax oder Post).

Nr.	Wartungsarbeiten (* Bestellnummer siehe Wartungscheck)	alle 50 Std.	alle 100 Std.	alle 200 Std.	alle 300 Std.	alle 400 Std.
1	Auswechseln des Motorsöl (SAE 15W/40 → 4 l)	•	•	•	•	•
2	Auswechseln des Motoröls *	•	•	•	•	•
3	Auswechseln des Hydrauliköl (Rando HLP-46 → 25 l)	•	•	•	•	•
4	Überprüfung des Hydrauliköls ggf. nachfüllen (Rando HLP-46 → 25 l)	•	•	•	•	•
5	Auswechseln des Kraftstoff-Ölfilters	•	•	•	•	•
6	Einsetzen des Luftfilters (bei starker Verschmutzung erneuern) *	•	•	•	•	•
7	Auswechseln des Kraftstoff-Ölfilters *	•	•	•	•	•
8	Auswechseln des Kraftstoff-Ölfilters *	•	•	•	•	•
9	Überprüfung des Kraftstoff-Ölfilters und des Klemmbandes	•	•	•	•	•
10	Überprüfung des Klemmbandes und des Klemmbandes	•	•	•	•	•
11	Überprüfung des Klemmbandes an Luftdruck	•	•	•	•	•
12	Auswechseln des Klemmbandes an Luftdruck *	•	•	•	•	•
13	Überprüfung des Klemmbandes und des Klemmbandes ggf. erneuern	•	•	•	•	•
14	Überprüfung der Abgasanlage auf Leckagen (Verbindungen nachprüfen)	•	•	•	•	•
15	Überprüfung der Klemmen auf Verschmutzung	•	•	•	•	•
16	Überprüfung der elektrischen Verkabelung auf lockere Anschlüsse	•	•	•	•	•
17	Überprüfung der Feuerungsgröße und des Klemmbandes	•	•	•	•	•
18	Nachladen der Batterie bei Bedarf wechseln	•	•	•	•	•
19	Überprüfung des Kühlersystems (Kühler, Wasserpumpe) (→ 4 l)	•	•	•	•	•
20	Auswechseln des Kühlersystems (Kühler, Wasserpumpe) (→ 4 l)	•	•	•	•	•
21	Überprüfung des Frostschutzmittels im Kühlwasser (vor jeder Frostperiode)	•	•	•	•	•
22	Überprüfung Öffnungsdruck des Kühlventils (Kühler)	•	•	•	•	•
23	Überprüfung des Druckventils	•	•	•	•	•
24	Überprüfung des Kompressoröls	•	•	•	•	•
25	Überprüfung der Hydraulikschläuche auf Leckagen (Verbindungen nachprüfen)	•	•	•	•	•
26	Funktion der Instrumente und Bedieneinrichtungen überprüfen	•	•	•	•	•
27	VM auf schadhafte, deformierte Bauteile und abnormale Geräusche prüfen	•	•	•	•	•
28	Alle Schrauben und Muttern nach ziehen, fehlende Verschraubungen ersetzen	•	•	•	•	•
29	Überprüfung des Klemmbandes (vorher 2,5 bar/36 psi, hinter 2,5 bar/36 psi)	•	•	•	•	•
30	Abnehmen des Klemmbandes	•	•	•	•	•
31	Überprüfung Kugelgelenk auf Festigkeit (135 Nm)	•	•	•	•	•
32	Überprüfung tragender Bauteile auf Risse	•	•	•	•	•
33	Alle Radbolzen nachziehen (130 Nm)	•	•	•	•	•
34	Überprüfung der Handbremse (ggf. 2,5 bar/36 psi)	•	•	•	•	•
35	Überprüfung des Lenkungs- u. Schwenkhebel ggf. nachziehen	•	•	•	•	•
36	Überprüfung des Lenkungshebel ggf. Kugelgelenk oder Spurstange austauschen *	•	•	•	•	•
37	Überprüfung der Lichtmaschine	•	•	•	•	•
38	Einrichtung Lenkungs des Kugelgelenks (0,15 mm)	•	•	•	•	•

Um das elektrische System von der Batterie abschalten, muss der Hauptschalter bei der VM-301-PAVERMAX an der rechten Seite des Motors unter der Motorhaube betätigt werden.

Für an der rechten Seite ist noch ein Hebel, der gezogen werden muss, um die Schwäche zu erzeugen.

Die Schwäche ist generell für Batterie-Neuprodukte abzusuchen, da sonst Schäden an der Elektronik entstehen können!

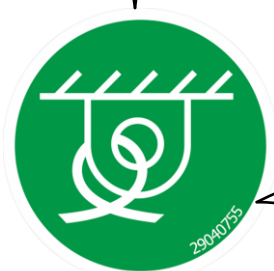
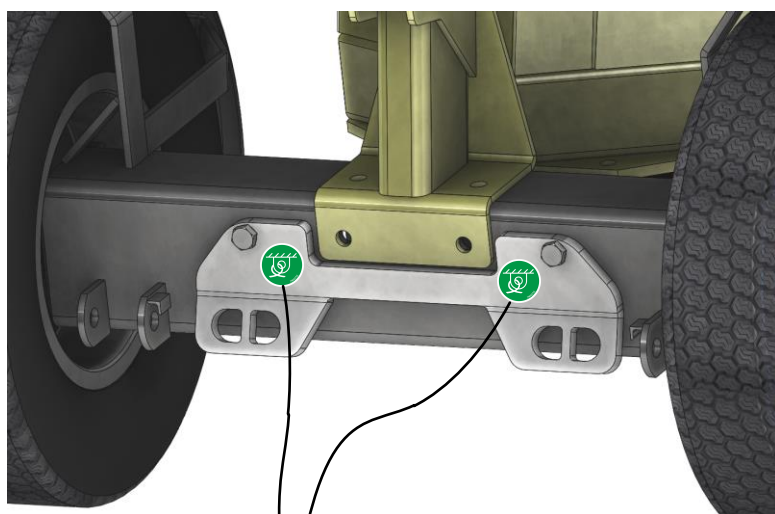
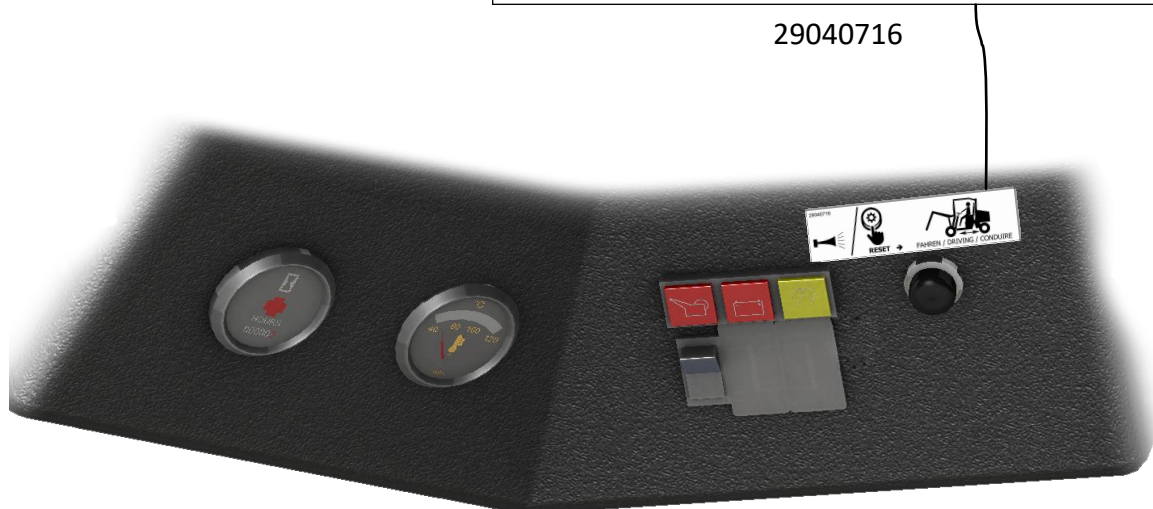
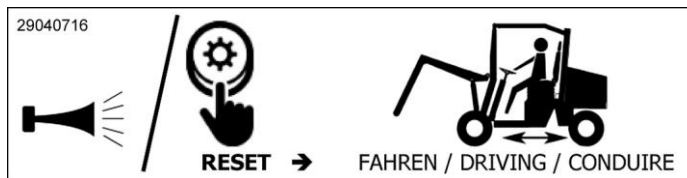
Überprüfung der Lichtmaschine, Klemmenanschlüsse, Motor, Hydraulik, Kühlwasser, Frostschutz, Batteriespannung.

29040610

29040610 (DE)
29040611 (GB)
29040612 (FR)



Beklebt von probst



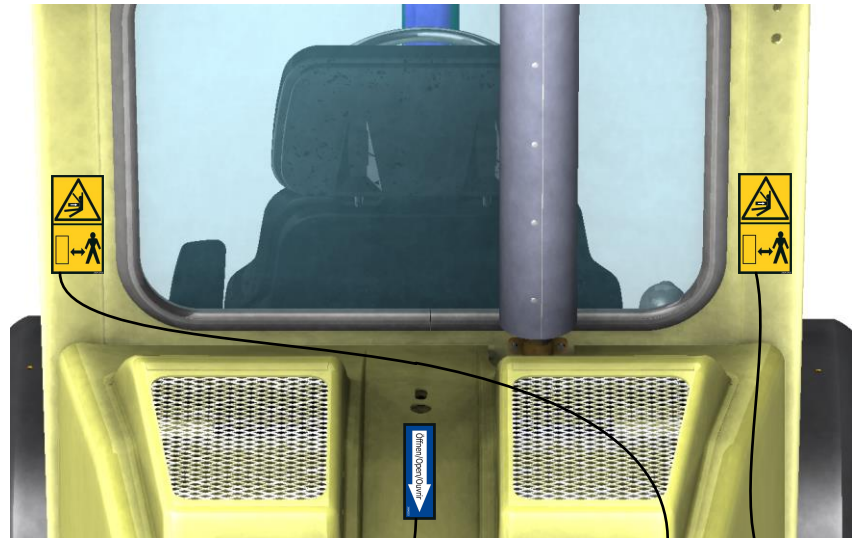
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Beklebt von VOP

VERBOT!
Deckel darf bei laufendem Motor
nicht geöffnet werden.
PROHIBITION!
Do not open while the engine is running.
INTERDICTION!
Ne pas ouvrir le capot lorsque
le moteur tourne.

29040259



Öffnen/Open/Ouvrir

29040253



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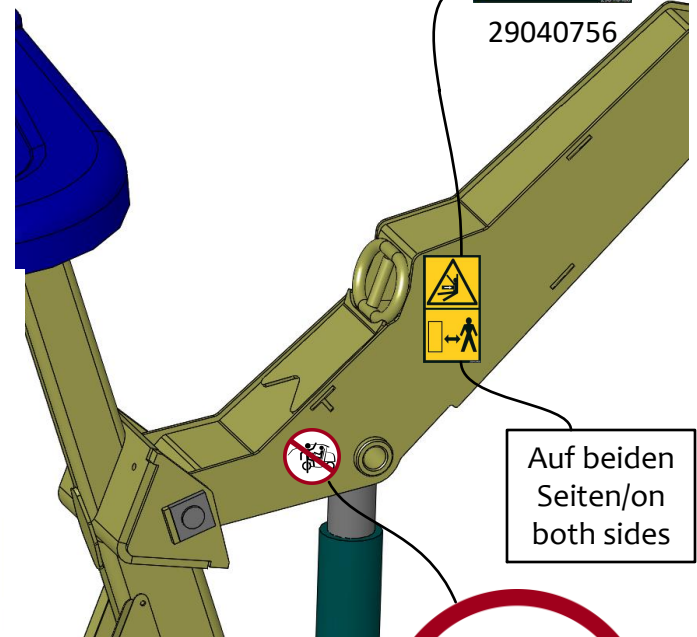
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DIESEL ☒ BIO-DIESEL ☒

29040483



Auf beiden
Seiten/on
both sides

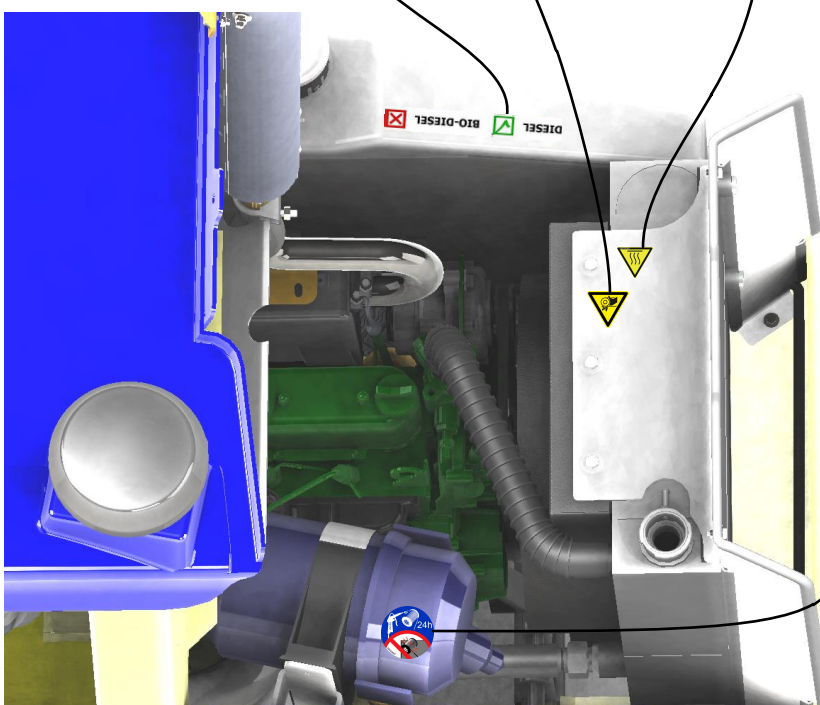


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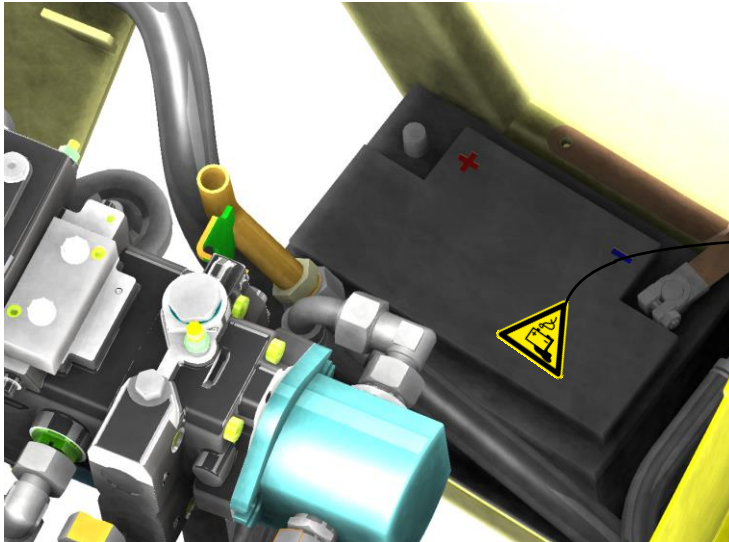
Auf beiden Seiten/
on both sides



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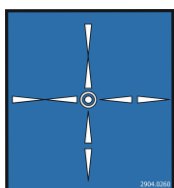
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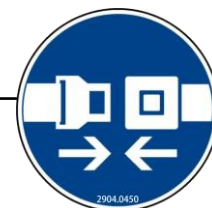
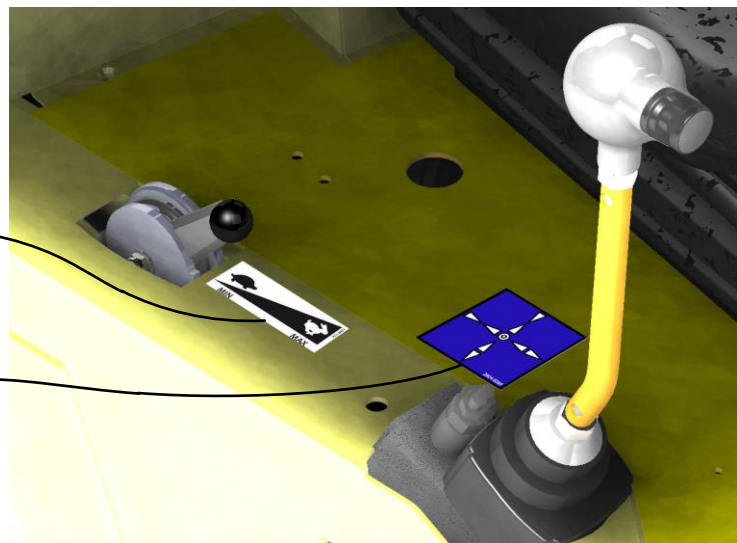
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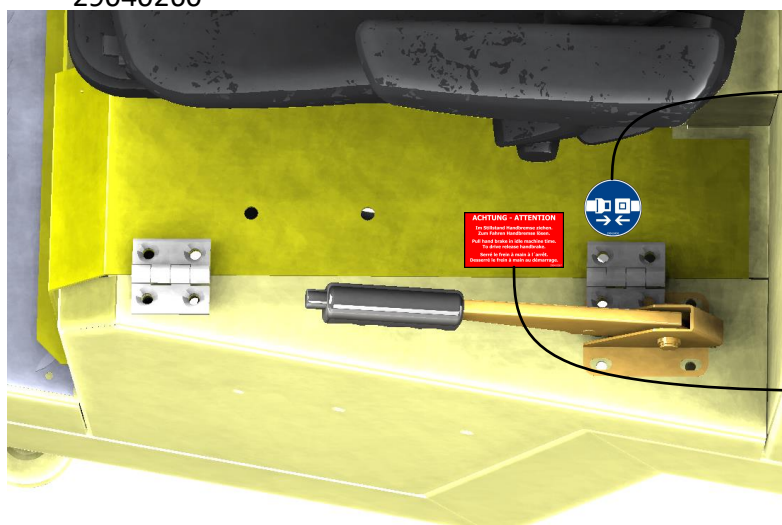
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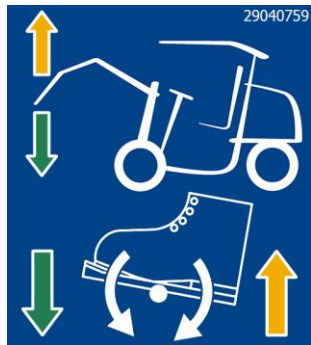
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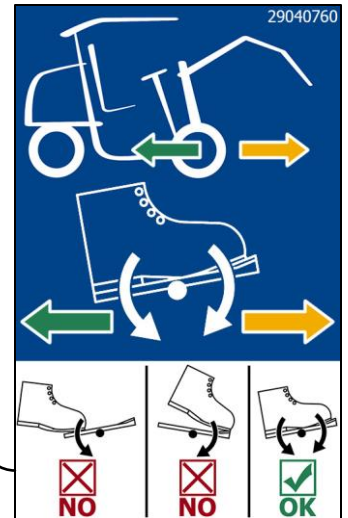
ACHTUNG - ATTENTION
Im Stillstand Handbremse ziehen.
Zum Fahren Handbremse lösen.
Pull hand brake in idle machine time.
To drive release handbrake.
Serré le frein à main à l'arrêt.
Desserré le frein à main au démarrage.

29040267

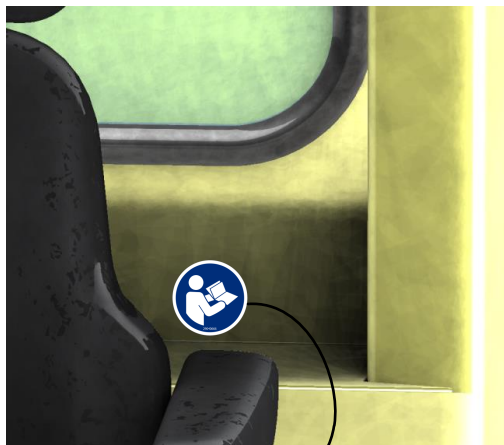
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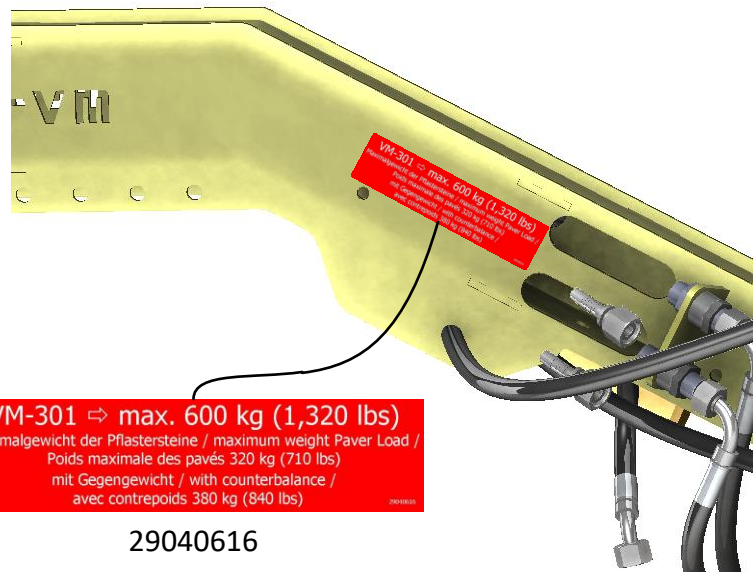
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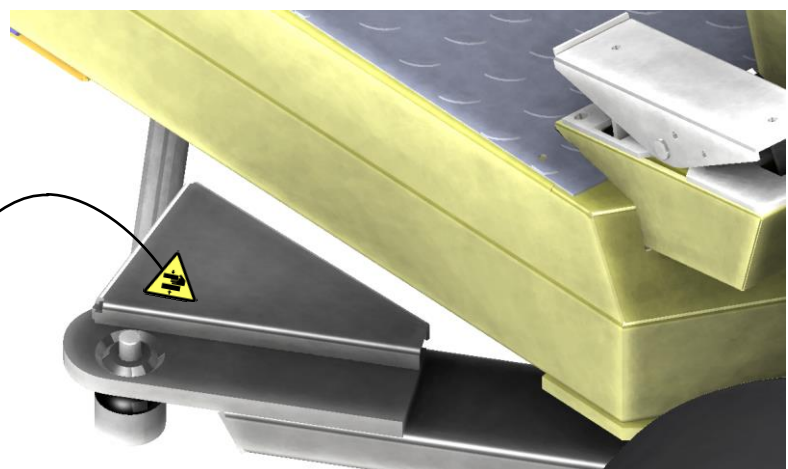


29040220



VM-301 ⇒ max. 600 kg (1,320 lbs)
 Maximalgewicht der Pflastersteine / maximum weight Paver Load /
 Poids maximale des pavés 320 kg (710 lbs)
 mit Gegengewicht / with counterbalance /
 avec contrepoids 380 kg (840 lbs)

29040616



Proof of maintenance

Warranty claim for this machine only apply for performance of the mandatory maintenance works (by an authorised specialist workshop)! After each completed performance of a maintenance interval the included form must be fill out, stamped, signed and send back to us immediately ¹⁾.

1) via e-mail to service@probst-handling.de / via fax or post

Operator: _____

Device type: _____

Device-No.: _____

Article -No.: _____

Year of make: _____

First inspection after 25 operating hours

Date:	Maintenance work:	Inspection by company:
		Company stamp
	
		Name Signature

All 50 operating hours

Date:	Maintenance work:	Inspection by company:
		Company stamp
	
		Name Signature
		Company stamp
	
		Name Signature
		Company stamp
	
		Name Signature

Minimum 1x per year

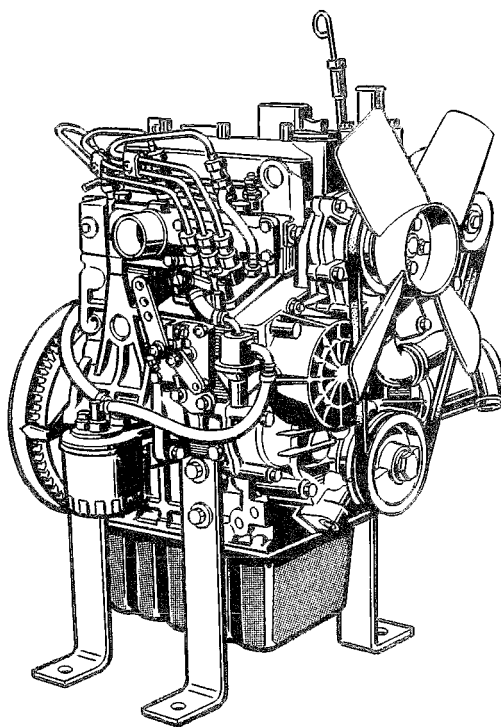
Date:	Maintenance work:	Inspection by company:
		Company stamp
	
		Name Signature
		Company stamp
	
		Name Signature

OPERATOR'S MANUAL

ENGLISH

KUBOTA DIESEL ENGINE

MODELS D905-E·V1205-E·V1505-E
D1005-E·V1205-TE·V1505-TE
D1105-E·V1305-E



D-2107

READ AND SAVE THIS BOOK

Kubota

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FOREWORD

You are now the proud owner of a KUBOTA Engine. This engine is a product of KUBOTA quality engineering and manufacturing. It is made of fine materials and under a rigid quality control system. It will give you long, satisfactory service. To obtain the best use of your engine, please read this manual carefully. It will help you become familiar with the operation of the engine and contains many helpful hints about engine maintenance. It is KUBOTA's policy to utilize as quickly as possible every advance in our research. The immediate use of new techniques in the manufacture of products may cause some small parts of this manual to be outdated. KUBOTA distributors and dealers will have the most up-to-date information. Please do not hesitate to consult with them.



SAFETY FIRST

This symbol, the industry's "Safety Alert Symbol", is used throughout this manual and on labels on the machine itself to warn of the possibility of personal injury. Read these instructions carefully. It is essential that you read the instructions and safety regulations before you attempt to assemble or use this unit.

**DANGER :**

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

**WARNING :**

Indicates a potentially hazardous situation which, if not avoided, **COULD** result in death or serious injury.

**CAUTION:**

Indicates a potentially hazardous situation which, if not avoided, **MAY** result in minor or moderate injury.

IMPORTANT :

Indicates that equipment or property damage could result if instructions are not followed.

NOTE :

Gives helpful information.



SAFE OPERATION

Careful operation is your best insurance against an accident. Read and understand this section carefully before operating the engine. All operators, no matter how much experience they may have had, should read this and other related manuals before operating the engine or any equipment attached to it. It is the owner's obligation to instruct all operators in safe operation.

Be sure to observe the following for safe operation.

OBSERVE SAFETY INSTRUCTIONS

- Read and understand carefully this "OPERATOR'S MANUAL" and "LABELS ON THE ENGINE" before attempting to start and operate the engine.
- Learn how to operate and work safely. Know your equipments and its limitations. Always keep the engine in good condition.
- Before allowing other people to use your engine, explain how to operate and have them read this manual before operation.
- DO NOT modify the engine by yourself. UNAUTHORIZED MODIFICATIONS to the engine may impair the function and/or safety and affect engine life.



F-8822

WEAR SAFETY CLOTHING

- DO NOT wear loose, torn or bulky clothing around the machine that may catch on working controls and projections causing personal injury.
- Use additional safety items, e.g. hard hat, safety protection, gloves, etc., as appropriate or required.
- DO NOT operate machine or any equipment attached to it while under alcohol, medication, or other drugs, or while fatigued.
- DO NOT wear radio or music headphones while operating engine.



B-1501 改

CHECK BEFORE OPERATION & STARTING THE ENGINE

- Be sure to check the engine before operation. If something is wrong with the engine, do not fail to repair it quickly.
- Keep all guards and shields in place before operating the engine. Replace any that are damaged or missing.
- Check to see if there is a safe distance from the engine before starting.
- Always keep the engine at least 3 feet (1 meter) away from buildings and other facilities.
- DO NOT allow children or livestock to approach the machine while the engine is running.
- DO NOT start the engine by shorting across starter terminals. The machine may start in gear and move.



B-1497

KEEP AROUND THE ENGINE CLEAN

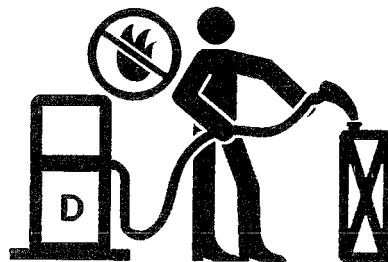
- Be sure to stop the engine before cleaning.
- Keep the engine clean and free of accumulated dirt, grease and trash to avoid a fire. Store flammable fluids away from sparks and fire.
- DO NOT stop the engine without idling; Temperatures around the engine rise suddenly. Keep the engine idling for over about 5 minutes before stopping.



B-1500

SAFE HANDLING OF FUEL AND LUBRICANTS —KEEP OFF FIRE—

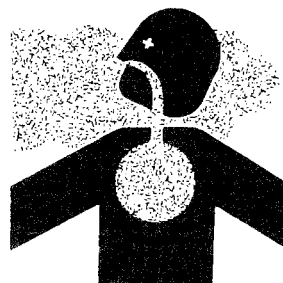
- Always stop the engine before refueling or/and lubricating.
- DO NOT smoke or allow flames or sparks in your working area. Fuel is extremely flammable and explosive under certain conditions.
- Refuel at a well ventilated and open place. When fuel and lubricants are spilled, refuel after letting engine cool off.
- DO NOT mix gasoline or alcohol with diesel fuel. The mixture can cause a fire.



B-1499

EXHAUST GASES & FIRE PREVENTION

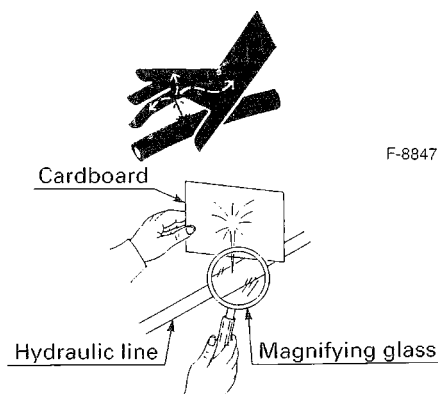
- Engine exhaust fumes can be very harmful if allowed to accumulate. Be sure to run the engine in a well ventilated place and where there are no people or livestock near the engine.
- The exhaust gas from the muffler is very hot. To prevent a fire, do not expose dry grass, mowed grass, oil and any other combustible materials to exhaust gas. Also, keep the engine and muffler clean all the time.
- To avoid a fire, be alert for leaks of flammables from hoses and lines. Be sure to check for leaks from hoses or pipes, such as fuel and hydraulic by following the maintenance check list.
- To avoid a fire, do not short across power cables and wires. Check to see that all power cables and wirings are in good condition. Keep all power connections clean. Bare wire or frayed insulation can cause a dangerous electrical shock and personal injury.



F-8842

ESCAPING FLUID

- Relieve all pressure in the air, the oil and the cooling systems before any lines, fittings or related items are removed or disconnected.
- Be alert for possible pressure when disconnecting any device from a system that utilizes pressure. DO NOT check for pressure leaks with your hand. High pressure oil or fuel can cause personal injury.
- Escaping hydraulic fluid under pressure has sufficient force to penetrate skin causing serious personal injury.
- Fluid escaping from pinholes may be invisible. Use a piece of cardboard or wood to search for suspected leaks: do not use hands and body. Use safety goggles or other eye protection when checking for leaks.
- If injured by escaping fluid, see a medical doctor immediately. This fluid can produce gangrene or severe allergic reaction.



F-8847

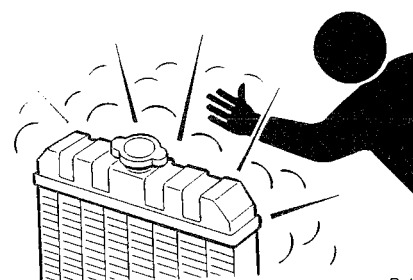
F-2359

CAUTIONS AGAINST BURNS & BATTERY EXPLOSION

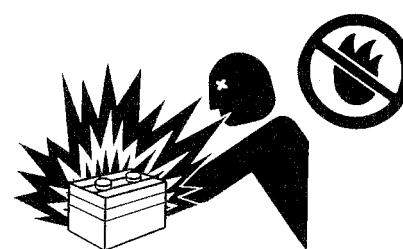
- To avoid burns, be alert for hot components, e.g. muffler, muffler cover, radiator, pipings, engine body, coolants, engine oil, etc. during operation and just after the engine has been shut off.
- DO NOT remove the radiator cap while the engine is running or immediately after stopping. Otherwise hot water will spout out from radiator. Wait for more than ten minutes to cool the radiator, before removing the cap.
- Make sure to shut the drain valve of coolant and oil to close pressure cap, to fasten pipe band before operating. If those parts are taken off, or loosen, it will result in serious personal injury.
- The battery presents an explosive hazard. When the battery is being activated, hydrogen and oxygen gases are extremely explosive.
- Do not use or charge the battery if its fluid level stands below the LOWER mark.
Otherwise, the component parts may deteriorate earlier than expected, which may shorten the service life or cause an explosion. Immediately, add distilled water until the fluid level is between the UPPER and LOWER levels.
- Keep sparks and open flames away from the battery, especially when charging the battery. DO NOT strike a match near the battery.
- DO NOT check battery charge by placing a metal object across the terminals. Use a voltmeter or hydrometer.
- DO NOT charge battery if frozen. It can be explosive. When frozen, warm the battery up more than 16°C (61°F).



B-1502



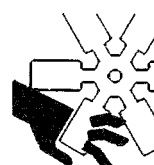
B-1503



F-8836

HANDS AND BODY AWAY FROM THE ROTATING PARTS

- Be sure to stop the engine before checking or adjusting belt tension and cooling fan.
- Keep your hands and body away from the rotating parts, such as cooling fan, V-belt, fan drive V-belt pulley or flywheel causing personal injury.
- DO NOT run the engine with installed safety guards detached. Install safety guards securely during operation.



B-1505



B-1506

ANTI-FREEZE & DISPOSAL OF FLUIDS

- Anti-freeze contains poison. Wear rubber gloves to avoid personal injury. In case of contact with skin, wash it off immediately.
- DO NOT mix different types of Anti-freeze. The mixture can produce chemical reaction causing harmful substances. Use approved or genuine KUBOTA Anti-freeze.
- Be mindful of the environment and the ecology. Before draining any fluids, find out the correct way of disposing of them. Observe the relevant environmental protection regulations when disposing of oil, fuel, coolant, brake fluid, filters and batteries.
- When draining fluids from the engine, place some container underneath the engine body.
- DO NOT pour waste onto the grounds, down a drain, or into any water source.



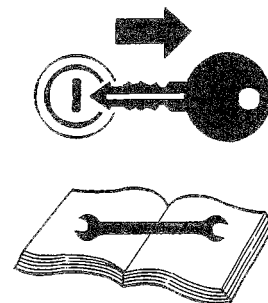
B-1508



B-1507

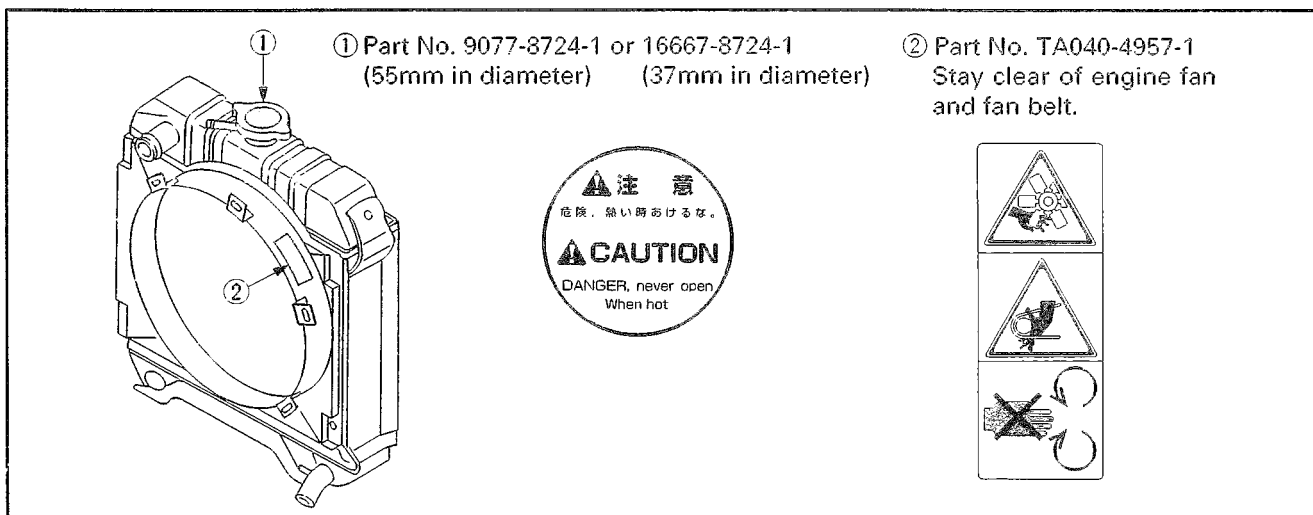
CONDUCTING SAFETY CHECKS & MAINTENANCE

- When checking engine or servicing, place the engine on a wide and level ground. **DO NOT** work on anything that is supported **ONLY** by lift jacks or a hoist. Always use blocks or correct stands to support the engine before servicing.
- Detach the battery from the engine before conducting service. Put a "DO NOT OPERATE!" tag in the key switch to avoid accidental starting.
- To avoid sparks from an accidental short circuit always disconnect the battery's ground cable \ominus first and connect it last.
- Be sure to stop the engine and remove the key when conducting daily and periodic maintenance, servicing and cleaning.
- Check or conduct maintenance after the engine, coolant, muffler, or muffler cover have been cooled off completely.
- Always use the appropriate tools and jig-fixture in good condition when performing any service work. Make sure you understand how to use them before service.
- Use **ONLY** correct engine barring techniques for manually rotating the engine. **DO NOT** attempt to rotate the engine by pulling or prying on the cooling fan and V-belt. This practise can cause serious personal injury or premature machine damage to the cooling fan.
- Replace fuel pipes and lubricant pipes with their hose clamps every 2 years or earlier whether they are damaged or not. They are made of rubber and are aged gradually.
- When servicing is performed together by two or more persons, take care to perform all work safely.
- Keep first aid kit and fire extinguisher handy at all times.



B-1509

WARNING AND CAUTION LABELS



CARE OF WARNING AND CAUTION LABELS

- (1) Keep warning and caution labels clean and free from obstructing material.
- (2) Clean warning and caution labels with soap and water, dry with a soft cloth.
- (3) Replace damaged or missing warning and caution labels with new labels from your local KUBOTA dealer.
- (4) If a component with warning and caution label(s) affixed is replaced with new part, make sure new label(s) is (are) attached in the same location(s) as the replaced component.
- (5) Mount new warning and caution labels by applying on a clean dry surface and pressing any bubbles to outside edge.

SERVICING OF THE ENGINE

Your dealer is interested in your new engine and has the desire to help you get the most value from it. After reading this manual thoroughly, you will find that you can do some of the regular maintenance yourself.

However, when in need of parts or major service, be sure to see your KUBOTA dealer.

For service, contact the KUBOTA Dealership from which you purchased your engine or your local KUBOTA dealer.

When in need of parts, be prepared to give your dealer the engine serial number.

Locate the serial number now and record them in the space provided.

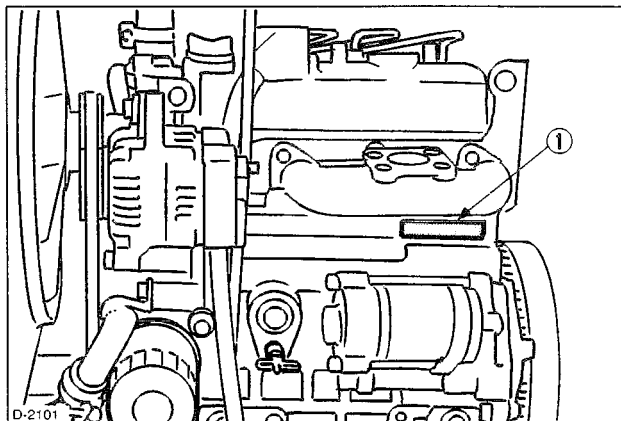
Type	Serial No.
------	------------

Engine	_____	_____
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Date of Purchase	_____
------------------	-------

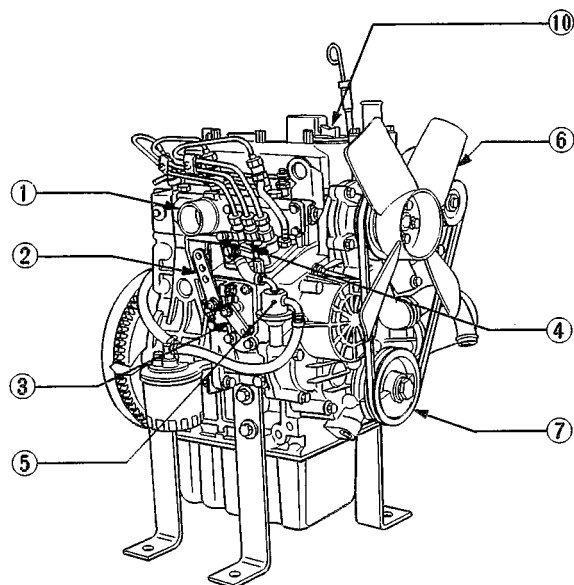
Name of Dealer	_____
----------------	-------

(To be filled in by purchaser)

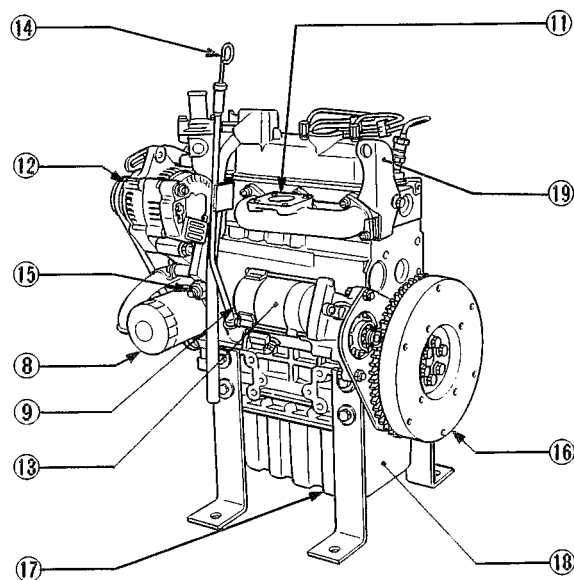


(1) Engine serial number

NAMES OF PARTS



D-2106



D-2105

- (1) Intake manifold
- (2) Speed control lever
- (3) Engine stop lever
- (4) Injection pump
- (5) Fuel feed pump
- (6) Cooling fan
- (7) Fan drive pulley
- (8) Oil filter cartridge
- (9) Water drain cock

- (10) Oil filler plug
- (11) Exhaust manifold
- (12) Alternator
- (13) Starter
- (14) Oil level gauge
- (15) Oil pressure switch
- (16) Flywheel
- (17) Oil drain plug
- (18) Oil pan
- (19) Engine hook

PRE-OPERATION CHECK

BREAK-IN

During the engine break-in period, observe the following by all means:

1. Change engine oil and oil filter cartridge after the first 50 hours of operation (See "ENGINE OIL" in PERIODIC SERVICE Section).
2. When ambient temperature is low, operate the machine after the engine has been completely warmed up.

DAILY CHECK

To prevent trouble from occurring, it is important to know the conditions of the engine well. Check it before starting.



CAUTION

To avoid personal injury:

- Be sure to install shields and safeguards attached to the engine when operating.
 - Stop the engine at a flat and wide space when checking.
 - Keep dust or fuel away from the battery, wiring, muffler and engine to prevent a fire.
- Check and clear them before operating everyday. Pay attention to the heat of the exhaust pipe or exhaust gas so that it can not ignite trash.

Item		Ref. page
1. Parts which had trouble in previous operation.		–
2. By walking around the machine	(1) Oil or water leaks	13 to 18
	(2) Engine oil level and contamination	13, 14
	(3) Amount of fuel	10
	(4) Amount of coolant	15 to 18
	(5) Dust in air cleaner dust cup	19, 20
	(6) Damaged parts and loosened bolts and nuts	–
3. By inserting the key into the starter switch	(1) Proper functions of meters and pilot lamps; no stains on these parts	–
	(2) Proper functions of glow lamp timer	–
4. By starting the engine	(1) Color of exhaust fumes	7
	(2) Unusual engine noise	7

OPERATING THE ENGINE

STARTING THE ENGINE (NORMAL)



CAUTION

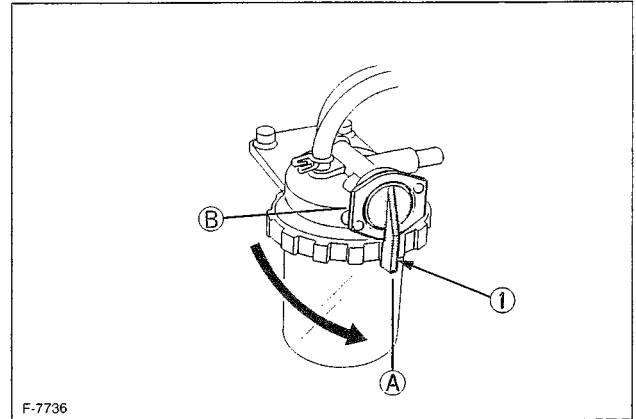
To avoid personal injury:

- Do not allow children to approach the machine while the engine is running.
- Be sure to install the machine on which the engine is installed, on a flat place.
- Do not run the engine on gradients.
- Do not run the engine in an enclosed area. Exhaust gas can cause air pollution and exhaust gas poisoning.
- Keep your hands away from rotating parts (such as fan, pulley, belt, flywheel etc.) during operation.
- Do not operate the machine while under the influence of alcohol or drugs.
- Do not wear loose, torn or bulky clothing around the machine. It may catch on moving parts or controls, leading to the risk of accident. Use additional safety items, e.g. hard hat, safety boots or shoes, eye and hearing protection, gloves, etc., as appropriate or required.
- Do not wear radio or music headphones while operating engine.
- Check to see if it is safe around the engine before starting.
- Reinstall safeguards and shields securely and clear all maintenance tools when starting the engine after maintenance.

IMPORTANT:

- Do not use ether or any starting fluid for starting the engine, or a severe damage will occur.
- When starting the engine after a long storage (of more than 3 months), first set the stop lever to the "STOP" position and then activate the starter for about 10 seconds to allow oil to reach every engine part.

1. Set the fuel lever to "ON".

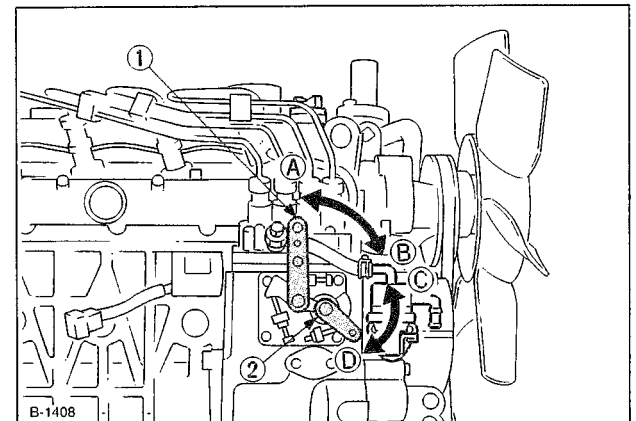


(1) Fuel lever

(A) "ON"
(B) "OFF"

2. Place the engine stop lever in the "START" position.

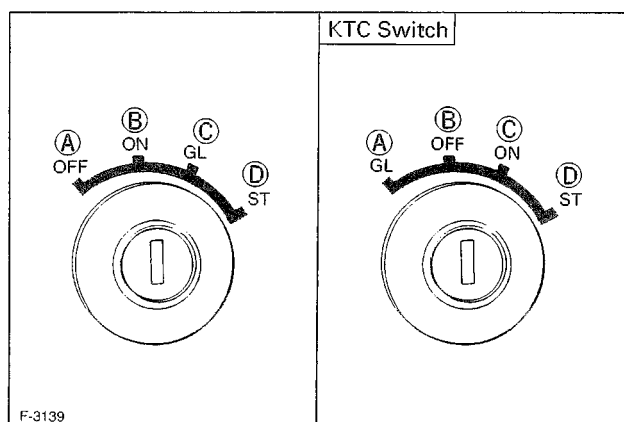
3. Place the speed control lever at more than half "OPERATION".



(1) Speed control lever
(2) Engine stop lever

(A) "IDLING"
(B) "OPERATION"
(C) "START"
(D) "STOP"

4. Insert the key into the key switch and turn it "ON".



- (A) "SWITCHED OFF"
(B) "OPERATION"
(C) "PREHEATING"
(D) "STARTING"

- (A) "PREHEATING"
(B) "SWITCHED OFF"
(C) "OPERATION"
(D) "STARTING"

5. Turn the starter switch to the "PREHEATING" position to allow the glow lamp to redden.

6. Turn the key to the "STARTING" position and the engine should start. Release the key immediately when the engine starts.

7. Check to see that the oil pressure lamp and charge lamp are off. If the lamps are still on, immediately stop the engine, and determine the cause.

(See "CHECKS DURING OPERATION" in OPERATING THE ENGINE Section)

NOTE:

- If the oil pressure lamp should be still on, immediately stop the engine and check;
 - if there is enough engine oil.
 - if the engine oil has dirt in it.
 - if the wiring is faulty.

8. Warm up the engine at medium speed without load.

IMPORTANT:

- If the glow lamp should redden too quickly or too slowly, immediately ask your KUBOTA dealer to check and repair it.
- If the engine does not catch or start at 10 seconds after the starter switch is set at "STARTING", wait for another 30 seconds and then begin the engine starting sequence again. Do not allow the starter motor to run continuously for more than 20 seconds.

COLD WEATHER STARTING

If the ambient temperature is below* -5°C(23°F) and the engine is very cold, start it in the following manner:

Take steps (1) through (4) left.

5. Turn the key to "PREHEATING(GLOW)" position and keep it there for a certain period mentioned below.

IMPORTANT:

- Shown below are the standard preheating times for various temperatures. This operation, however, is not required, when the engine is warmed up.

Ambient temperature	Preheating time	
	Ordinary heat type	With glow lamp timer
Above 10°C (50°F)	NO NEED	
10°C (50°F) to -5°C (23°F)	Approx. 5 seconds	See NOTE:
*Below -5°C (23°F)	Approx. 10 seconds	
Limit of continuous use	20 seconds	

NOTE:

- In case of installing standard glow lamp, glow lamp goes off after about 6 seconds, when the starter switch key is turned to preheating position. However if necessary, keep the starter switch key at preheating position for longer time, according to the left recommendation.

6. Turn the key to "ST (STARTING)" position and the engine should start.

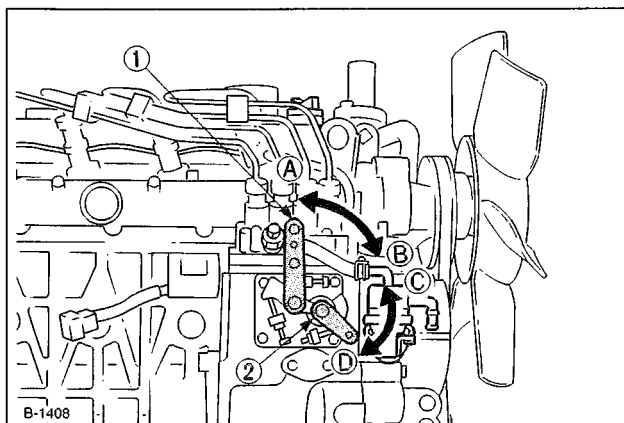
(If the engine fails to start after 10 seconds, turn off the key for 5 to 30 seconds. Then repeat steps (5) and (6).)

IMPORTANT:

- Do not allow the starter motor to run continuously for more than 20 seconds.

STOPPING THE ENGINE

1. Return the speed control lever to low idle, and run the engine under idling conditions.
2. Set the engine stop lever to the "STOP" position.
3. With the starter switch placed at the "OFF" position, remove the key. (Be sure to return the engine stop lever to the "START" position to be ready for the next start.)



(1) Speed control lever
(2) Engine stop lever

(A) "IDLING"
(B) "OPERATION"
(C) "START"
(D) "STOP"

IMPORTANT

- If equipped with a turbo-charger, allow the engine to idle for 5 minutes before shutting it off after a full load operation. Failure to do so may lead to turbo-charger trouble.

CHECKS DURING OPERATION

While running, make the following checks to see that all parts are working correctly.

■ Radiator Cooling water (Coolant)



WARNING

To avoid personal injury:

- Do not remove radiator cap until coolant temperature is well below its boiling point. Then loosen cap slightly to the stop position, to relieve any pressure, before removing cap completely.

When the engine overheats and hot coolant overflows through the radiator and hoses, stop the engine immediately and make the following checks to determine the cause of trouble:

Check item

1. Check to see if there is any coolant leak;
2. Check to see if there is any obstacle around the cooling air inlet or outlet;
3. Check to see if there is any dirt or dust between radiator fins and tube;
4. Check to see if the fan belt is too loose;
5. Check to see if radiator water pipe is clogged; and
6. Check to see if anti-freeze is mixed to a 50/50% mix of water and anti-freeze.

■ Oil pressure lamp

The lamp lights up to warn the operator that the engine oil pressure has dropped below the prescribed level. If this should happen during operation or should not go off even after the engine is accelerated more than 1000rpm, immediately stop the engine and check the following:

1. Engine oil level (See "ENGINE OIL" in MAINTENANCE Section).
2. Lubricant system (See "ENGINE OIL" in MAINTENANCE Section).

■ Fuel



CAUTION

To avoid personal injury:

- Fluid escaping from pinholes may be invisible. Do not use hands to search for suspected leaks; Use a piece of cardboard or wood, instead. If injured by escaping fluid, see a medical doctor at once. This fluid can produce gangrene or a severe allergic reaction.
- Check any leaks from fuel pipes or fuel injection pipes. Use eye protection when checking for leaks.

Be careful not to empty the fuel tank. Otherwise air may enter the fuel system, requiring fuel system bleeding. (See "FUEL" in MAINTENANCE Section).

■ Color of exhaust

While the engine is run within the rated output range:

- The color of exhaust remains colorless.
- If the output slightly exceeds the rated level, exhaust may become a little colored with the output level kept constant.
- If the engine is run continuously with dark exhaust emission, it may lead to trouble with the engine.

■ Immediately stop the engine if;

- The engine suddenly slow down or accelerates.
- Unusual noises suddenly appear.
- Exhaust fumes suddenly become very dark.
- The oil pressure lamp or the water temperature alarm lamp lights up.

REVERSED ENGINE REVOLUTION AND REMEDIES



CAUTION

To avoid personal injury:

- Reversed engine operation can make the machine reverse and run it backwards. It may lead to serious trouble.
- Reversed engine operation may make exhaust gas gush out into the intake side and ignite the air cleaner; It could catch fire.

Reversed engine revolution must be stopped immediately since engine oil circulation is cut quickly, leading to serious trouble.

■ How to tell when the engine starts running backwards

1. Lubricating oil pressure drops sharply. Oil pressure warning light, if used, will light.
2. Since the intake and exhaust sides are reversed, the sound of the engine changes, and exhaust gas will come out of the air cleaner.
3. A louder knocking sound will be heard when the engine starts running backwards.

■ Remedies

1. Immediately set the engine stop lever to the "STOP" position to stop the engine.
2. After stopping the engine, check the air cleaner, intake rubber tube and other parts and replace parts as needed.

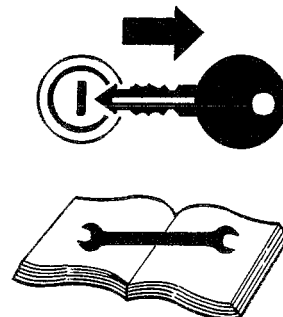
MAINTENANCE



CAUTION

To avoid personal injury:

- Be sure to conduct daily checks, periodic maintenance, refueling or cleaning on a level surface with the engine shut off and remove the key.
- Before allowing other people to use your engine, explain how to operate, and have them read this manual before operation.
- When cleaning any parts, do not use gasoline but use regular cleanser.
- Always use proper tools, that are in good condition. Make sure you understand how to use them, before performing any service work.
- When installing, be sure to tighten all bolts lest they should be loose. Tighten the bolts by the specified torque.
- Do not put any tools on the battery, or battery terminals may short out. Severe burns or fire could result. Detach the battery from the engine before maintenance.
- Do not touch muffler or exhaust pipes while they are hot; Severe burns could result.



B-1509



B-1497

SERVICE INTERVALS

Observe the following for service and maintenance.

The lubricating oil change intervals listed in the table below are for Classes CF, CE and CD lubricating oils of API classification with a low-sulfur fuel in use. If the CF-4 or CG-4 lubricating oil is used with a high-sulfur fuel, change the lubricating oil at shorter intervals than recommended in the table below depending on the operating condition.

Interval	Item	Ref. Page		
Every 50 hours	Check of fuel pipes and clamp bands	12		@
See NOTE:	Change of engine oil	13, 14	⊙	
Every 100 hours	Cleaning of air cleaner element	19, 20	*1	@
	Cleaning of fuel filter	12		
	Check of battery electrolyte level	20		
	Check of fan belt tightness	22		
Every 200 hours	Check of radiator hoses and clamp bands	17		
	Replacement of oil filter cartridge	15	⊙	
	Check of intake air line	—		@

Interval	Item	Ref. Page		
Every 400 hours	Replacement of fuel filter cartridge	13		@
Every 500 hours	Removal of sediment in fuel tank	—		
	Cleaning of water jacket (radiator interior)	15 to 18		
	Replacement of fan belt	22		
Every one or two months	Recharging of battery	20		
Every year	Replacement of air cleaner element	19, 20	*2	@
	Check of damage in electric wiring and loose connections	—		
Every 800 hours	Check of valve clearance	24		
Every 1500 hours	Check of fuel injection nozzle injection pressure	—	*3	@
Every 3000 hours	Check of turbo charger	—	*3	@
	Check of injection pump	—	*3	@
	Check of fuel injection timer	—	*3	@
Every two years	Change of radiator coolant (L.L.C.)	17		
	Replacement of battery	20		
	Replacement of radiator hoses and clamp bands	18		
	Replacement of fuel pipes and clamp bands	12	*3	@
	Replacement of intake air line	—	*4	@

IMPORTANT

- The jobs indicated by © must be done after the first 50 hours of operation.
 - *1 Air cleaner should be cleaned more often in dusty conditions than in normal conditions.
 - *2 After 6 times of cleaning.
 - *3 Consult your local KUBOTA Dealer for this service.
 - *4 Replace only if necessary.
 - When the battery is used for less than 100 hours in a year, check its electrolyte yearly. (for refillable battery's only)
 - The items listed above (@ marked) are registered as emission related critical parts by KUBOTA in the U.S. EPA nonroad emission regulation. As the engine owner, you are responsible for the performance of the required maintenance on the engine according to the above instruction.
- Please see the Warranty Statement in detail.

NOTE:

- Changing interval of engine oil depends on the conditions below.

Models	Oil pan depth	
	Above 125 mm (4.9 in.)	※below 101 mm (4.0 in.)
All models	200 Hrs	150 Hrs
Initial	50 Hrs	

- ※ 101mm oil pan depth is optional.
- ※※ Standard replacement interval
 - API service classification: above CD grade
 - Ambient temperature: below 35 °C (95 °F)

NOTE:**Lubricating oil**

With the emission control now in effect, the CF-4 and CG-4 lubricating oils have been developed for use of a low-sulfur fuel on on-road vehicle engines. When an

off-road vehicle engine runs on a high-sulfur fuel, it is advisable to employ the CF, CD or CE lubricating oil with a high total base number. If the CF-4 or CG-4 lubricating oil is used with a high-sulfur fuel, change the lubricating oil at shorter intervals.

- **Lubricating oil recommended when a low-sulfur or high-sulfur fuel is employed.**

○ : Recommendable × : Not recommendable

Lubricating oil class	Fuel		Remarks
	Low sulfur	High sulfur	
CF	○	○	TBN ≥ 10
CF-4	○	×	
CG-4	○	×	

PERIODIC SERVICE

FUEL

Fuel is flammable and can be dangerous. You should handle fuel with care.



CAUTION

To avoid personal injury:

- Do not mix gasoline or alcohol with diesel fuel. This mixture can cause an explosion.
- Be careful not to spill fuel during refueling. If fuel should spill, wipe it off at once, or it may cause a fire.
- Do not fail to stop the engine before refueling. Keep the engine away from the fire.
- Be sure to stop the engine while refueling or bleeding and when cleaning or changing fuel filter or fuel pipes. Do not smoke when working around the battery or when refueling.
- Check the above fuel systems at a well ventilated and wide place.
- When fuel and lubricant are spilled, refuel after letting the engine cool off.
- Always keep spilled fuel and lubricant away from engine.

Fuel level check and refueling

1. Check to see that the fuel level is above the lower limit of the fuel level gauge.
2. If the fuel is too low, add fuel to the upper limit. Do not overfill.

No.2-D is a distillate fuel oil of lower volatility for engines in industrial and heavy mobile service. (SAE J313 JUN87)

Grade of Diesel Fuel Oil According to ASTM D975

Flash Point, °C (°F)	Water and Sediment, volume %	Carbon Residue on, 10 percent Residuum, %	Ash, weight %
Min	Max	Max	Max
52 (125)	0.05	0.35	0.01

Distillation Temperatures, °C (°F) 90% Point		Viscosity Kinematic cSt or mm ² /s at 40°C		Viscosity Saybolt, SUS at 100°F		Sulfur, weight %	Copper strip Corrosion	Cetane Number
Min	Max	Min	Max	Min	Max	Max	Max	Min
282 (540)	338 (640)	1.9	4.1	32.6	40.1	0.50	No.3	40

The cetane number is required not to be less than 45.

IMPORTANT:

- Be sure to use a strainer when filling the fuel tank, or dirt or sand in the fuel may cause trouble in the fuel injection pump.
- For fuel, always use diesel fuel. You are required not to use alternative fuel, because its quality is unknown or it may be inferior in quality. Kerosene, which is very low in cetane rating, adversely affects the engine. Diesel fuel differs in grades depending on the temperature.
- Be careful not to let the fuel tank become empty, or air can enter the fuel system, necessitating bleeding before next engine start.

■ Air bleeding the fuel system



CAUTION

To avoid personal injury;

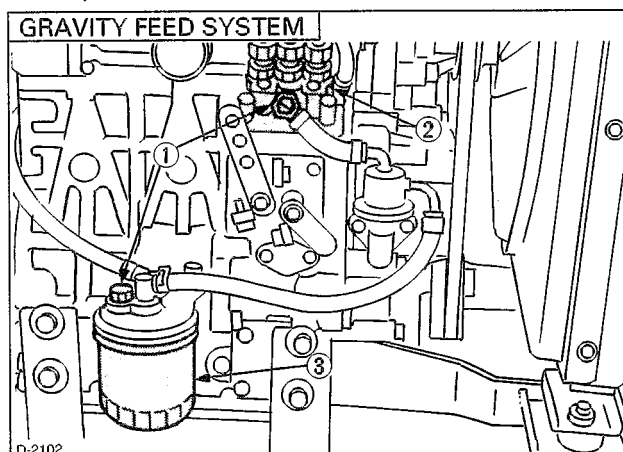
- Do not bleed a hot engine as this could cause fuel to spill onto a hot exhaust manifold creating a danger of fire.

Air bleeding of the fuel system is required if;

- after the fuel filter and pipes have been detached and refitted;
- after the fuel tank has become empty; or
- before the engine is to be used after a long storage.

[PROCEDURE A] (gravity feed fuel tanks only)

1. Fill the fuel tank to the fullest extent. Open the fuel filter lever.
2. Loosen air vent plug of the fuel filter a few turns.
3. Screw back the plug when bubbles do not come up any more.
4. Open the air vent plug on top of the fuel injection pump.
5. Retighten the plug when bubbles do not come up any more.



- (1) Air vent plug
(2) Injection pump
(3) Fuel filter

[PROCEDURE B]

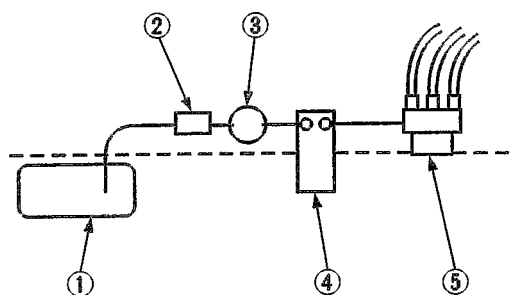
(fuel tanks lower than injection pump)

1. For fuel tanks that are lower than the injection pump. The fuel system must be pressurized by the fuel system electric fuel pump.
2. If an electric fuel pump is not used, you must manually actuate the pump by lever to bleed.
3. The primary fuel filter (3) must be on the pressure side of the pump if the fuel tank is lower than the injection pump.
4. To bleed follow (2) through (5) above.

IMPORTANT:

- Tighten air vent plug of the fuel injection pump except when bleeding, or it may stop the engine suddenly.

TANK BELOW INJECTION PUMP SYSTEM



B-1536

- (1) Fuel tank below injection pump
(2) Pre-filter
(3) Electric or Mechanical pump
(4) Main Filter
(5) Injection pump

■ Checking the fuel pipes



CAUTION

To avoid personal injury:

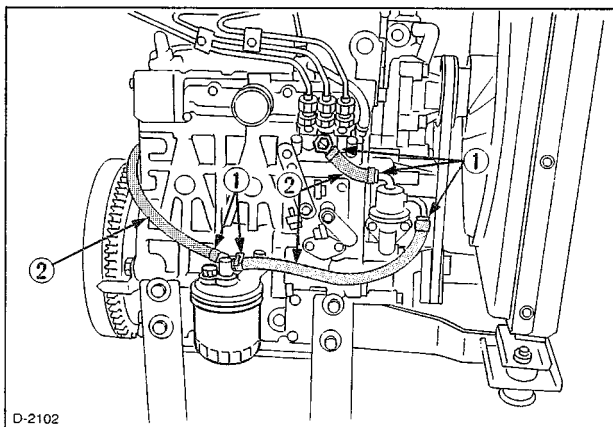
- Check or replace the fuel pipes after stopping the engine. Broken fuel pipes can cause fires.

Check the fuel pipes every 50 hours of operation. When if;

1. If the clamp band is loose, apply oil to the screw of the band, and tighten the band securely.
2. If the fuel pipes, made of rubber, become worn out, replace them and the clamp bands every two years.
3. If the fuel pipes and clamp bands are found worn or damaged before two years'time, replace or repair them at once.
4. After replacement of the pipes and bands, air-bleed the fuel system.

IMPORTANT:

- When the fuel pipes are not installed, plug them at both ends with clean cloth or paper to prevent dirt from entering. Dirt in the pipes can cause fuel injection pump malfunction.

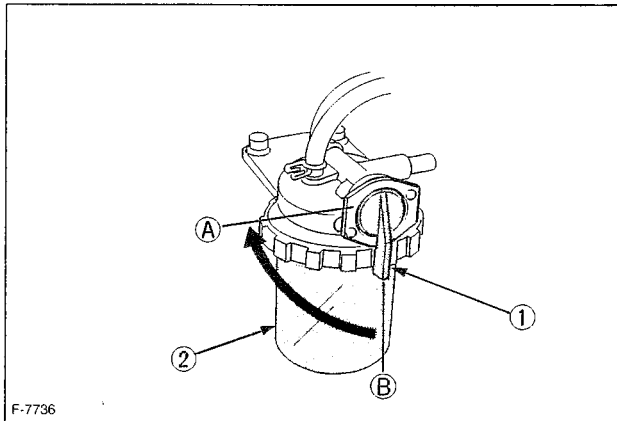


(1) Clamp band
(2) Fuel pipe

■ Cleaning the fuel filter pot

Every 100 hours of operation, clean the fuel filter in a clean place to prevent dust intrusion.

1. Close the fuel filter lever.

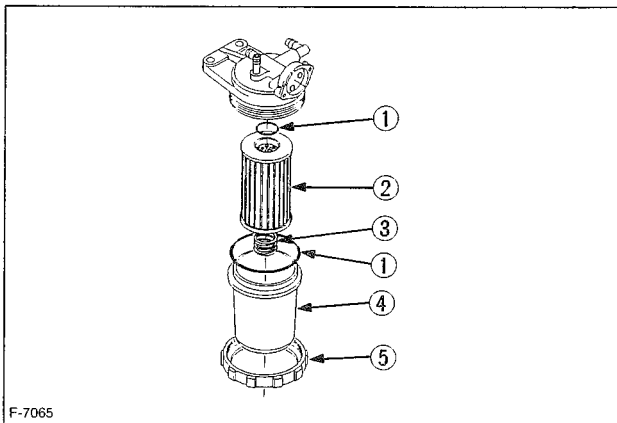


(1) Fuel filter lever (A) "OFF"
(2) Fuel filter pot (B) "ON"

2. Remove the top cap, and rinse the inside with diesel fuel.
3. Take out the element, and rinse it with diesel fuel.
4. After cleaning, reinstall the fuel filter, keeping out of dust and dirt.
5. Air-bleed the injection pump.

IMPORTANT:

- Entrance of dust and dirt can cause a malfunction of the fuel injection pump and the injection nozzle. Wash the fuel filter cup periodically.



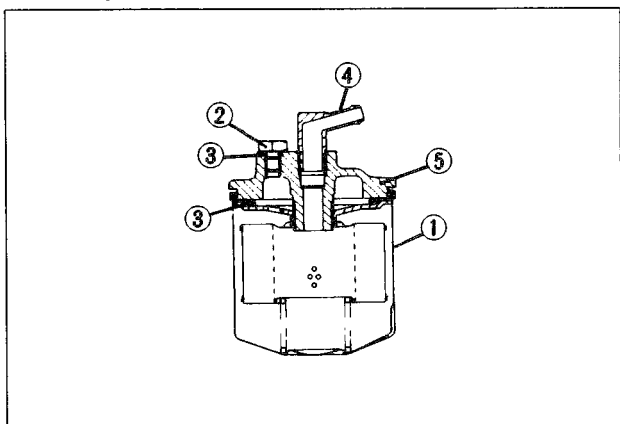
(1) O ring
(2) Filter element
(3) Spring
(4) Filter bowl
(5) Screw ring

■ Fuel filter cartridge replacement

1. Replace the fuel filter cartridge with a new one every 400 operating hours.
2. Apply fuel oil thinly over the gasket and tighten the cartridge into position by hand-tightening only.
3. Finally, vent the air.

IMPORTANT:

- Replace the fuel filter cartridge periodically to prevent wear of the fuel injection pump plunger or the injection nozzle, due to dirt in the fuel.



- (1) Fuel filter cartridge
(2) Air vent plug
(3) O ring
(4) Pipe joint
(5) Cover

ENGINE OIL



CAUTION

To avoid personal injury:

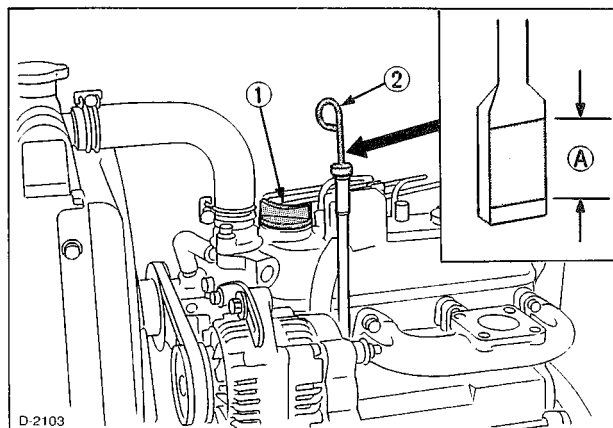
- Be sure to stop the engine before checking and changing the engine oil and the oil filter cartridge.
- Do not touch muffler or exhaust pipes while they are hot; Severe burns could result. Always stop the engine and allow it to cool before conducting inspections, maintenance, or for a cleaning procedure.
- Contact with engine oil can damage your skin.
Put on gloves when using engine oil. If you come in contact with engine oil, wash it off immediately.

NOTE:

- Be sure to inspect the engine, locating it on a level place. If placed on gradients accurately, oil quantity may not be measured.

■ Checking oil level and adding engine oil

1. Check the engine oil level before starting or more than 5 minutes after stopping the engine.
2. Remove the oil level gauge, wipe it clean and reinstall it.
3. Take the oil level gauge out again, and check the oil level.



- (1) Oil filler plug
(2) Oil level gauge

[Lower end of oil level gauge]
(A) Engine oil level within this range is proper.

4. If the oil level is too low, remove the oil filler plug, and add new oil to the prescribed level.
5. After adding oil, wait more than 5 minutes and check the oil level again. It takes some time for the oil to drain down to the oil pan.

Engine oil quantity

Model	Quantity
D905-E, D1005-E, D1105-E	5.1 L (1.35 U.S.gals.)
V1205-E, V1305-E, V1505-E	6.0 L (1.59 U.S.gals.)
V1205-TE, V1505-TE	6.7 L (1.77 U.S.gals.)

Oil quantities shown are for standard oil pans.

IMPORTANT:

- Engine oil should be MIL-L-2104C or have properties of API classification CD grades or higher.

Change the type of engine oil according to the ambient temperature.

above 25°C (77°F)	SAE30 or SAE10W-30 SAE10W-40
0 to 25°C (32 to 77°F)	SAE20 or SAE10W-30 SAE10W-40
below 0°C (32°F)	SAE10W or SAE10W-30 SAE10W-40

- When using oil of different brands from the previous one, be sure to drain all the previous oil before adding the new engine oil.

■ Changing engine oil

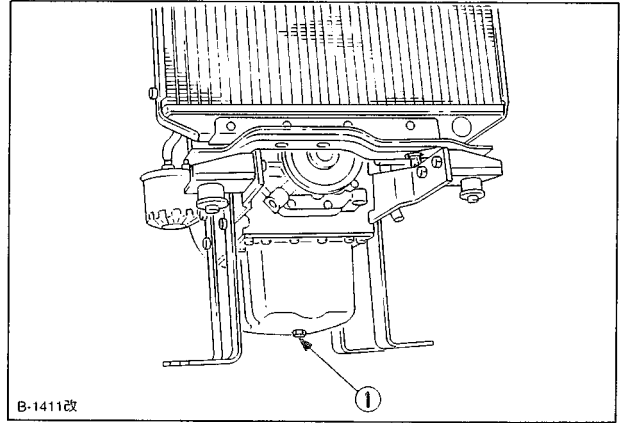


CAUTION

To avoid personal injury:

- Be sure to stop the engine before draining engine oil.
- When draining engine oil, place some container underneath the engine and dispose it according to local regulations.
- Do not drain oil after running the engine. Allow engine to cool down sufficiently.

1. Change oil after the initial 50 hours of operation and every 200 hours thereafter.
2. Remove the drain plug at the bottom of the engine, and drain all the old oil. Drain oil will drain easier when the oil is warm.



(1) Oil drain plug

3. Add new engine oil up to the upper limit of the oil level gauge.

■ Replacing the oil filter cartridge

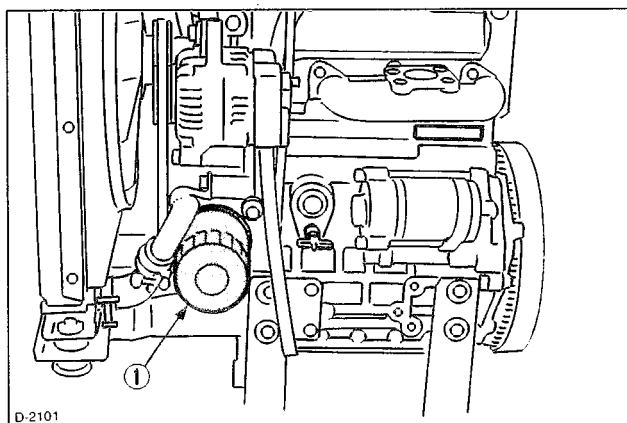


CAUTION

To avoid personal injury:

- Be sure to stop the engine before changing the oil filter cartridge.
- Allow engine to cool down sufficiently, oil can be hot and cause burns.

1. Replace the oil filter cartridge after the initial 50 hours of operation and every 200 hours thereafter.
2. Remove the old oil filter cartridge with a filter wrench.
3. Apply a film of oil to the gasket for the new cartridge.
4. Screw in the cartridge by hand. When the gasket contacts the seal surface, tighten the cartridge enough by hand. Because, if you tighten the cartridge with a wrench, it will be tightened too much.



D-2101

(1) Oil filter cartridge

Remove with a filter wrench

(Tighten with your hand)

5. After the new cartridge has been replaced, the engine oil level normally decreases a little. Thus, run the engine for a while and check for oil leaks through the seal before checking the engine oil level. Add oil if necessary.

NOTE:

- Wipe off any oil sticking to the machine completely.

RADIATOR

Coolant will last for one day's work if filled all the way up before operation. Make it a rule to check the coolant level before every operation.



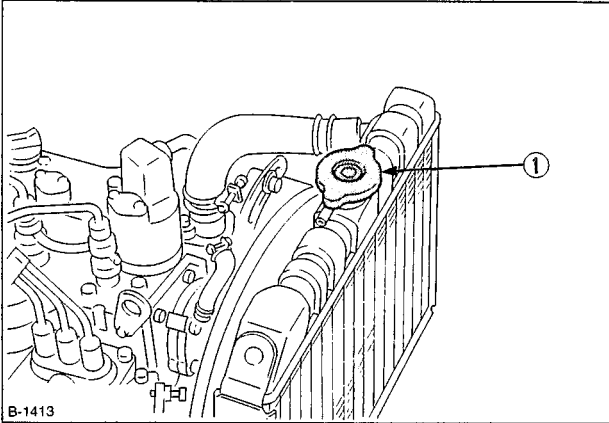
WARNING

To avoid personal injury:

- Do not stop the engine suddenly, stop it after about 5 minutes of unloaded idling.
- Work only after letting the engine and radiator cool off completely (more than 30 minutes after it has been stopped).
- Do not remove the radiator cap while coolant is hot. When cool to the touch, rotate cap to the first stop to allow excess pressure to escape. Then remove cap completely. If overheats should occur, steam may gush out from the radiator or reserve tank; Severe burns could result.

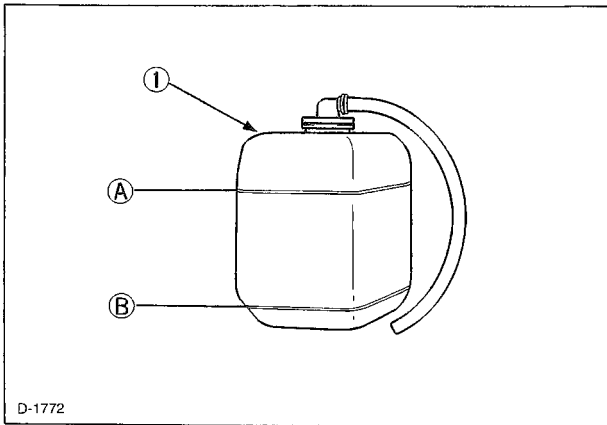
■ Checking coolant level, adding coolant

1. Remove the radiator cap after the engine has completely cooled, and check to see that coolant reaches the supply port.



(1) Radiator pressure cap

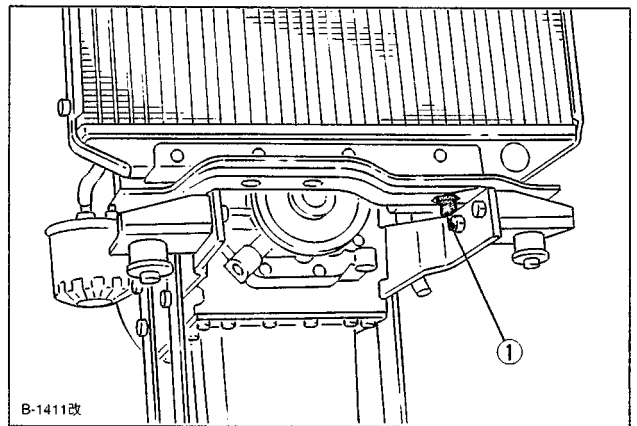
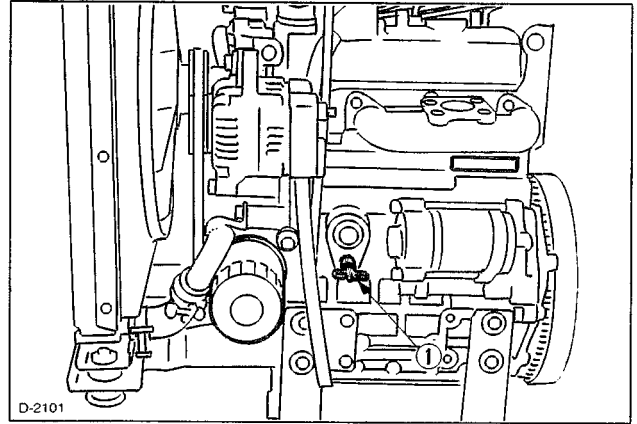
2. If the radiator is provided with a reserve tank, check the coolant level of the reserve tank. When it is between the "FULL" and "LOW" marks, the coolant will last for one day's work.



(1) Reserve tank

(A) "FULL"
(B) "LOW"

3. When the coolant level drops due to evaporation, add water only up to the full level.
4. Check to see that two drain cocks; one is at the crankcase side and the other is at the lower part of the radiator as figures below.



(1) Coolant drain cock

IMPORTANT:

- If the radiator cap has to be removed, follow the caution and securely retighten the cap.
- If coolant should be leak, consult your local KUBOTA dealer.
- Make sure that muddy or sea water does not enter the radiator.
- Use clean, fresh water and 50% anti-freeze to fill the recovery tank.
- Do not refill reserve tank with coolant over the "FULL" level mark.
- Be sure to close the radiator cap securely. If the cap is loose or improperly closed, coolant may leak out and decrease quickly.

■ Changing coolant

1. To drain coolant, always open both drain cocks and simultaneously open the radiator cap as well. With the radiator cap kept closed, a complete drain of water is impossible.
2. Remove the overflow pipe of the radiator pressure cap to drain the reserve tank.
3. Prescribed coolant volume (U.S.gallons)

Models	Quantity
D905-E, D1005-E, D1105-E	3.1 L (0.82 U.S.gals.)
V1205-E, V1305-E, V1505-E	4.0 L (1.06 U.S.gals.)
V1205-TE, V1505-TE	5.0 L (1.32 U.S.gals.)

NOTE:

- Coolant quantities shown are for standard radiators.
4. An improperly tightened radiator cap or a gap between the cap and the seat quickens loss of coolant.
 5. Coolant (Radiator cleaner and anti-freeze)

Season	Coolant
Summer	Pure water and radiator cleaner
Winter (When temperature drops below 0°C (32°F)) or all season	Pure water and anti-freeze (See "Anti-freeze" in RADIATOR section)

■ Remedies for quick decrease of coolant

1. Check any dust and dirt between the radiator fins and tube. If any, remove them from the fins and the tube.
2. Check the tightness of the fan belt. If loose, tighten it securely.
3. Check the internal blockage in the radiator hose. If scale forms in the hose, clean with the scale inhibitor or its equivalent.

■ Checking radiator hoses and clamp



CAUTION

To avoid personal injury:

- Be sure to check radiator hoses and hose clamps periodically. If radiator hose is damaged or coolant leaks, overheats or severe burns could occur.

Check to see if radiator hoses are properly fixed every 200 hours of operation or 6 months, whichever comes first.

1. If hose clamps are loose or water leaks, tighten hose clamps securely.
2. Replace hoses and tighten hose clamps securely, if radiator hoses are swollen, hardened or cracked.

Replace hoses and hose clamps every 2 years, or earlier, if checked and found that hoses are swollen, hardened or cracked.

■ Precaution at overheating

Take the following actions in the event the coolant temperature is nearly or more than the boiling point, what is called "Overheating". Take these actions if the engine's alarm buzzer sounds or the alarm lamp lights up.

1. Stop the engine operation in a safe place and keep the engine unloaded idling.
2. Do not stop the engine suddenly. Stop it after about 5 minutes of unloaded idling.
3. If the engine stalls within about 5 minutes of running under no load, immediately leave and keep yourself away from the machine. Do not open the hood and any other part.
4. Keep yourself and others well away from the engine for further 10 minutes or while the steam blown out.
5. Checking that there gets no danger such as burn, get rid of the causes of overheating according to the manual, see "TROUBLESHOOTING" section. And then, start again the engine.

■ Cleaning radiator core (outside)

If dust is between the fin and tube, wash it away with running water.

IMPORTANT:

- Do not clean radiator with firm tools such as spatulas or screwdrivers. They may damage specified fin or tube. It can cause coolant leaks or decrease coolings performance.

■ Anti-freeze



CAUTION

To avoid personal injury:

- When using anti-freeze, put on some protection such as rubber gloves.
- If should drink anti-freeze, throw up at once and take medical attention.
- When anti-freeze comes in contact with the skin or clothing, wash it off immediately.
- Do not mix different types of anti-freeze.
- Keep fire and children away from anti-freeze.
- Be mindful of the environment and ecology. Before draining any fluids, find out the correct way of disposing by checking with local codes.
- Also, observe the relevant environmental protection regulations when disposing of oil, fuel, coolant, brake fluid, filters and batteries.

If it freezes, coolant can damage the cylinders and radiator. It is necessary, if the ambient temperature falls below 0°C (32°F), to remove coolant after operating or to add anti-freeze to it.

1. There are two types of anti-freeze available; use the permanent type (PT) for this engine.
2. Before adding anti-freeze for the first time, clean the radiator and engine interior by pouring fresh water, and draining it a few times.
3. The procedure for the mixing of water and anti-freeze differs according to the make of the anti-freeze and the ambient temperature. Refer to SAE J1034 standard, more specifically also to SAE J814c.
4. Mix the anti-freeze with water, and then fill into the radiator.

IMPORTANT:

- When the anti-freeze is mixed with water, the anti-freeze mixing ratio must be less than 50%.

Vol % Anti-freeze	Freezing Point		Boiling Point ※	
	°C	°F	°C	°F
40	-24	-12	106	222
50	-37	-34	108	226

※ At 1.013×10⁵Pa (760mmHg) pressure (atmospheric).
A higher boiling point is obtained by using a radiator pressure cap which permits the development of pressure within the cooling system.

NOTE:

- The above data represents industry standards that necessitate a minimum glycol content in the concentrated anti-freeze.
- When the coolant level drops due to evaporation, add water only to keep the anti-freeze mixing ratio less than 50%. In case of leakage, add anti-freeze and water in the specified mixing ratio before filling into the radiator.
- Anti-freeze absorbs moisture. Keep unused anti-freeze in a tightly sealed container.
- Do not use radiator cleaning agents when anti-freeze has been added to the coolant. (Anti-freeze contains an anti-corrosive agent, which will react with the radiator cleaning agent forming sludge which will affect the engine parts.)

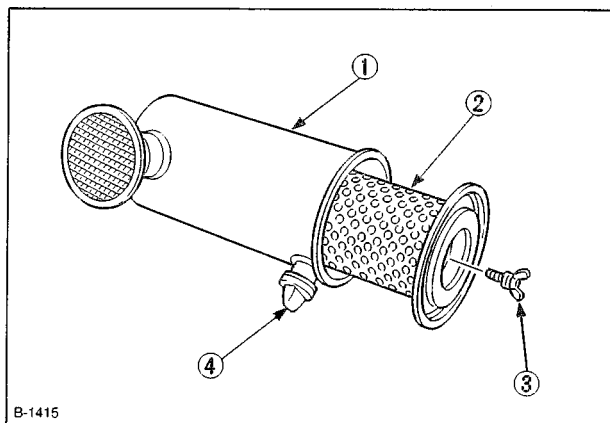
■ Radiator cement

As the radiator is solidly constructed, there is little possibility of water leakage. Should this happen, however, radiator cement can easily fix it. If leakage is serious, contact your local KUBOTA dealer.

AIR CLEANER

Since the air cleaner employed on this engine is a dry type, never apply oil to it.

1. Open the evacuator valve once a week under ordinary conditions — or daily when used in a dusty place. This will get rid of large particles of dust and dirt.
2. Wipe the inside air cleaner clean with cloth if it is dirty or wet.
3. Avoid touching the element except when cleaning.
4. When dry dust adheres to the element, blow compressed air from the inside turning the element. Pressure of compressed air must be under 205kPa (2.1kgf/cm², 30psi).
5. When carbon or oil adheres to the element, soak the element in detergent for 15 minutes, then wash it several times in water, rinse with clean water and dry it naturally.
6. After the element is fully dried, inspect the inside of the element with a light, and check if it is damaged or not. (referring to the instructions on the label attached to the element.)
7. Replace the element every year or every 6 cleanings.



- (1) Air cleaner body
(2) Element
(3) Wing bolt
(4) Evacuator valve

IMPORTANT:

- Make sure the wing bolt for the element is tight enough. If it is loose, dust and dirt may be sucked in, wearing down the cylinder liner and piston ring earlier, and thereby resulting in poor power output.
- Do not overservice the air cleaner element. Overservicing may cause dirt to enter the engine causing premature wear. Use the dust indicator as a guide on when to service.

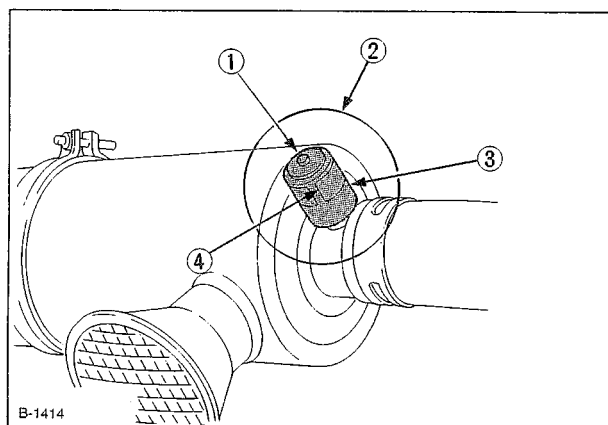
■ Evacuator valve

Open the evacuator valve once a week under ordinary conditions - or daily when used in a dusty place - to get rid of large particles of dust and dirt.

■ Dust indicator (optional)

If the red signal on the dust indicator attached to the air cleaner has reached the service level.

Clean the element immediately, and reset the signal with the "RESET" button.



- (1) "RESET" button
(2) Dust indicator
(3) Service level
(4) Signal

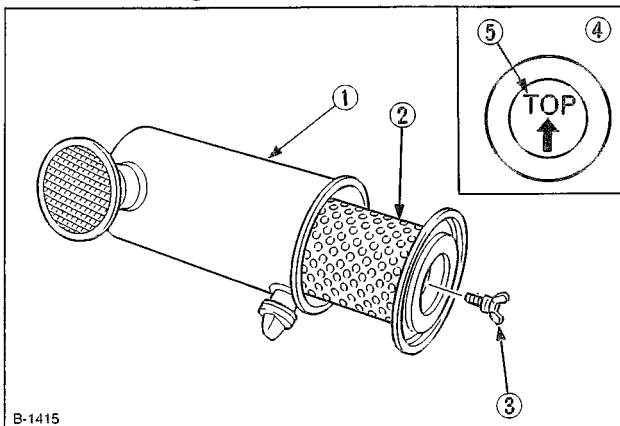
■ For the air cleaner with a dust cup (optional)

Remove and clean out the dust cup before it becomes half full with dust; usually once a week, or even every day if the working surroundings are dusty.

Install the air cleaner dust cup with "TOP" indicated on the rear of the cup in the up position. (However, it may be installed in either direction when the cover is placed at the lower part.)

IMPORTANT:

- If the dust cup is mounted incorrectly, dust or dirt does not collect in the cup, and direct attachment of the dust to the element will cause its lifetime to shorten to a great extent.



- (1) Air cleaner body
(2) Element
(3) Wing bolt
(4) Dust cup
(5) "TOP" mark

BATTERY

Mishandling of the battery shortens the service life and adds to maintenance costs. Obtain the maximum performance and the longest life of the battery by handling properly and with care.



CAUTION

To avoid personal injury:

- Be careful not to let the battery electrolyte contact your body or clothing.
- Wear eye protection and rubber gloves, since the diluted sulfuric acid solution burns skin and eats holes in clothing. Should this occur, immediately wash it off with running water and get medical attention.

Engine starting will be more difficult, if the battery charge is low. Be careful to recharge it at an early occasion before it is too late.

■ Battery charging



DANGER

The battery comes in two types: Refillable, Non-refillable.

- For using the refillable type battery, follow the instructions below.
Do not use or charge the battery if its fluid level stands below the LOWER (lower limit level) mark.
Otherwise, the battery component parts may deteriorate earlier than expected, which may shorten the battery's service life or cause an explosion.
Immediately, add distilled water until the battery's fluid level is between the UPPER and LOWER levels.

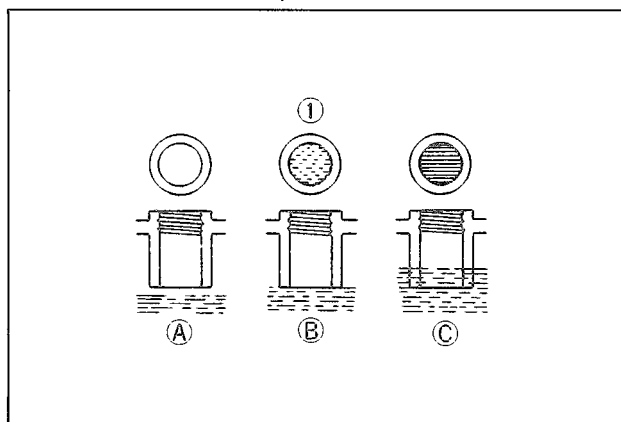


CAUTION

To avoid personal injury:

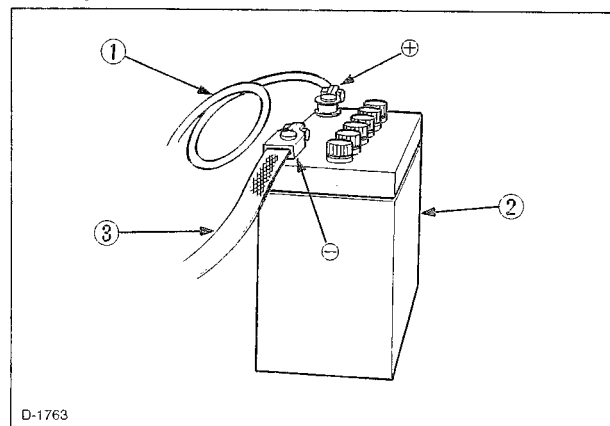
- When the battery is being activated, hydrogen and oxygen gases in the battery are extremely explosive. Keep open sparks and flames away from the battery at all times, especially when charging the battery.
- When charging the battery, remove the battery vent plugs.
- When disconnecting the cable from the battery, start with the negative terminal, and when connecting them, start with the positive terminal first.
- DO NOT check the battery charge by placing a metal object across the terminals. Use a voltmeter or hydrometer.

1. Make sure each electrolyte level is to the bottom of vent wells, if necessary, add only distilled water in a well-ventilated place.

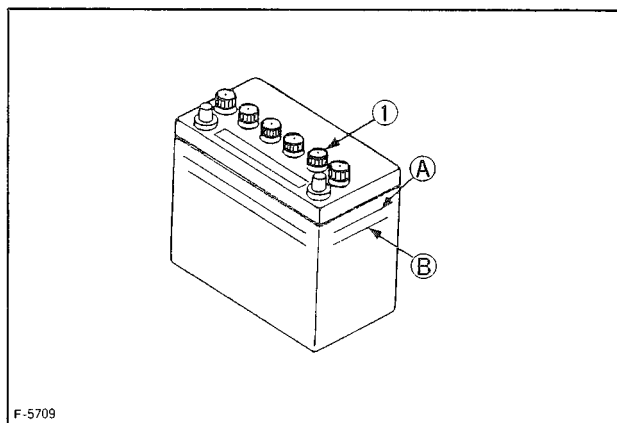


(1) Battery electrolyte level
(A) "TOO LOW"
(B) "PROPER"
(C) "TOO HIGH"

2. To slow charge the battery, connect the charger positive terminal to the battery positive terminal, and the negative to the negative, then recharge in the standard fashion.
3. Quick recharging charges the battery at a high rate in a short time. This is only for emergencies.
4. Recharge the battery as early as possible, or battery life will be extremely shortened.
5. When exchanging an old battery for a new one, use a battery of equal specifications shown in page 26, 27.



(1) Thick cable red (+)
(2) Battery case
(3) Earth cable black (-)



(1) Plug
(A) "HIGHEST LEVEL"
(B) "LOWEST LEVEL"

IMPORTANT:

- Connect the charger positive terminal to the battery positive terminal, and negative to the negative.
- When disconnecting the cable from the battery, start with the negative terminal first. When connecting the cable to the battery, start with the positive terminal first. If reversed, the contact of tools on the battery may cause a short.

Direction for long term storage

1. When storing the engine for long periods of time, remove the battery, adjust the electrolyte to the proper level, and store in a dry and dark place.
2. The battery naturally discharges while it is stored. Recharge it once a month in summer, and every 2 months in winter.

ELECTRIC WIRING



CAUTION

To avoid personal injury:

Shorting of electric cable or wiring may cause a fire.

- Check to see if electric cables and wiring are swollen, hardened or cracked.

- Keep dust and water away from all power connections.

Loose wiring terminal parts, make bad connections. Be sure to repair them before starting the engine.

Damaged wiring reduces the capacity of electrical parts. Change or repair damaged wiring immediately.

FAN BELT

■ Adjusting Fan Belt Tension



CAUTION

To avoid personal injury:

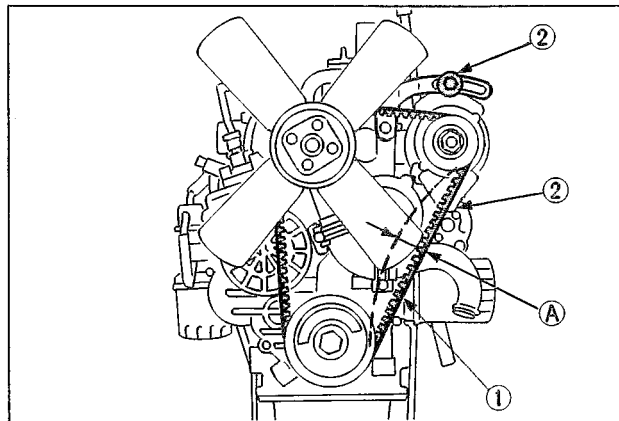
- Be sure to stop the engine and remove the key before checking the belt tension.
- Be sure to reinstall the detached safety shield after maintenance or checking.

Proper fan belt tension	A deflection of between 7 to 9 mm (0.28 to 0.35 in.) when the belt is pressed in the middle of the span.
-------------------------	--

1. Stop the engine and remove the key.
2. Apply moderate thumb pressure to belt between pulleys.
3. If tension is incorrect, loosen the alternator mounting bolts and, using a lever placed between the alternator and the engine block, pull the alternator out until the deflection of the belt falls within acceptable limits.
4. Replace fan belt if it is damaged.

IMPORTANT:

- If belt is loosen or damaged and the fan is damaged, it could result in overheats or insufficient charging. Correct or replace belt.



- (1) Fan belt (A) 7 to 9 mm (0.28 to 0.35 in.)
 (2) Bolt and nut (under load of 10 kgf (22.1 lbs))

CARRIAGE AND STORAGE

CARRIAGE



CAUTION

To avoid personal injury:

- Fix the engine securely not to fall during operation.
- Do not stand near or under the engine while carrying it.
- The engine is heavy. In handling it, be very alert not to get your hands and body caught in.

1. Use carrier such as crane when carrying the engine, or hurt your waist and yourself. Support the engine securely with rope not to fall while carrying it.
2. When lifting the engine, put the hook securely to metal fittings attached to the engine. Use strong hook and fittings enough to hang the engine.

STORAGE



CAUTION

To avoid personal injury:

- Do not clean the machine with engine running.
- To avoid the danger of exhaust fume poisoning, do not operate the engine in a closed building without proper ventilation.
- When storing the engine just after running, let the engine cool off.

Before storing the engine for more than a few months, remove any dirt on the machine, and:

1. Drain the coolant in the radiator. Open the cock at the bottom of the radiator, and remove the pressure cap to drain water completely. Leave the cock open. Hang a note written "No water" on the pressure cap. Since water may freeze when the temperature drops below 0°C (32°F), it is very important that no water is left in the machine.
2. Remove dirty engine oil, fill with new oil and run the engine for about 5 minutes to let the oil penetrate to all the parts.
3. Check all the bolts and nuts, and tighten if necessary.
4. Remove the battery from the engine, adjust the electrolyte level, and recharge it. Store the battery in a dry and dark place.
5. When the engine is not used for a long period of time, run it for about 5 minutes under no load every 2-3 months to keep it free from rust. If the engine is stored without any running, moisture in the air may condense into dew over the sliding parts of the engine, resulting in rust there.
6. If you forget to run the engine for longer than 5-6 months, apply enough engine oil to the valve guide and valve stem seal and make sure the valve works smoothly before starting the engine.
7. Store the engine in a flat place and remove the key from engine.
8. Do not store the engine in a place where has flammable materials such as dry grass or straw.
9. When covering the engine for storage, let engine and muffler cool off completely.
10. Operate the engine after checking and repairing damaged wirings or pipes, and clearing flammable materials carried by mouse.

TROUBLESHOOTING

If the engine does not function properly, use the following chart to identify and correct the cause.

■ When it is difficult to start the engine.

Cause	Countermeasures
Fuel is thick and doesn't flow.	<ul style="list-style-type: none"> * Check the fuel tank and fuel filter. Remove water, dirt and other impurities. * As all fuel will be filtered by the filter, if there should be water or other foreign matters on the filter, clean the filter with kerosene.
Air or water mixed in fuel system	<ul style="list-style-type: none"> * If air is in the fuel filter or injection lines, the fuel pump will not work properly. To attain proper fuel injection pressure, check carefully for loosened fuel line coupling, loose cap nut, etc. * Loosen joint bolt atop fuel filter and air vent screws of fuel injection pump to eliminate all the air in the fuel system.
Thick carbon deposits on orifice of injection nozzle.	<ul style="list-style-type: none"> * This is caused when water or dirt is mixed in the fuel. Clean the nozzle injection piece, being careful not to damage the orifice. * Check to see if nozzle is working properly or not. If not, install a new nozzle.
Valve clearance is wrong.	* Adjust valve clearance to 0.145 to 0.185 mm (0.0057 to 0.0072 in.) when the engine is cold.
Leaking valves	* Grind valves.
Fuel injection timing is wrong.	<ul style="list-style-type: none"> * Adjust injection timing * The injection timing 0.3 rad (18°) before top dead center.
Engine oil becomes thick in cold weather and engine cranks slow.	* Change grade of oil according to the weather (temperature.)
Low compression	<ul style="list-style-type: none"> * Bad valve or excessive wear of rings, pistons and liners cause insufficient compression. Replace with new parts.
Battery is discharged and the engine will not crank.	<ul style="list-style-type: none"> * Charge battery. * In winter, always remove battery from machine, charge fully and keep indoors. Install in machine at time of use.

■ When output is insufficient

Cause	Countermeasures
Carbon stuck around orifice of nozzle piece	<ul style="list-style-type: none"> * Clean orifice and needle valve, being very careful not to damage the nozzle orifice. * Check nozzle to see if good. If not, replace with new parts.
Compression is insufficient. Leaking valves	<ul style="list-style-type: none"> * Bad valve and excessive wear of rings, pistons and liners cause insufficient compression. Replace with new parts. * Grind valves.
Fuel is insufficient.	* Check fuel system.
Overheating of moving parts	<ul style="list-style-type: none"> * Check lubricating oil system. * Check to see if lubricating oil filter is working properly. * Filter element deposited with impurities would cause poor lubrication. Change element. * Check the clearance of bearing are within factory specs. * Check injection timing.
Valve clearance is wrong.	* Adjust to proper valve clearance of 0.145 to 0.185 mm (0.0057 to 0.0072 in.) with engine cold.
Air cleaner is dirty	* Clean the element every 100 hours of operation.
Fuel injection pressure is wrong.	* Adjust to proper pressure. 13.7 Mpa (140kgf/cm ² , 1991psi)
Injection pump wear	<ul style="list-style-type: none"> * Do not use poor quality fuel as it will cause wear of the pump. Only use No.2-D diesel fuel. * Check the fuel injection pump element and delivery valve assembly and replace as necessary.

NOTE:

- If the cause of trouble can not be found, contact your KUBOTA dealer.

■ When engine suddenly stops

Cause	Countermeasures
Lack of fuel	* Check the fuel tank and refill the fuel, if necessary. * Also check the fuel system for air or leaks.
Bad nozzle	* If necessary, replace with a new nozzle.
Moving parts are overheated due to shortage of lubrication oil or improper lubrication.	* Check amount of engine oil with oil level gauge. * Check lubricating oil system. * At every 2 times of oil change, oil filter cartridge should be replaced. * Check to see if the engine bearing clearances is within factory specs.

NOTE:

- When the engine has suddenly stopped, decompress the engine by the decomp and turn the engine lightly by pulling on the fan belt. If the engine turns easily without abnormalities, the cause of the trouble is usually lack of fuel or bad nozzle.

■ When color of exhaust is especially bad

Cause	Countermeasures
Fuel governing device bad	* Contact dealer for repairs.
Fuel is of extremely poor quality.	* Select good quality fuel Use No. 2-D diesel fuel only.
Nozzle is bad.	* If necessary, replace with new nozzle.
Combustion is incomplete.	* Cause is poor atomization, improper injection timing, etc. Because of trouble in injection system or in poor valve adjustment, or compression leakage, poor compression, etc. Check for the cause.

■ When engine must be stopped immediately

Cause	Countermeasures
Engine revolution suddenly decreases or increases.	* Check the adjustments, injection timing and the fuel system.
Unusual sound is heard suddenly.	* Check all moving parts carefully.
Color of exhaust suddenly turns dark.	* Check the fuel injection system, especially the fuel injection nozzle.
Bearing parts are overheated.	* Check the lubricating system.
Oil lamp lights up during operation.	* Check lubricating system. * Check, if the engine bearing clearances are within factory specs. * Check the function of the relieve valve in the lubricating system. * Check pressure switch. * Check filter base gasket.

■ When engine overheats

Cause	Countermeasures
Engine oil insufficient	* Check oil level. Replenish oil as required.
Fan belt broken or elongated	* Change belt or adjust belt tension.
Coolant insufficient	* Replenish coolant.
Excessive concentration of antifreeze	* Add water only or change to coolant with the specified mixing ratio.
Radiator net or radiator fin clogged with dust	* Clean net or fin carefully.
Inside of radiator or coolant flow route corroded	* Clean or replace radiator and parts.
Fan or radiator or radiator cap defective	* Replace defective part.
Thermostat defective	* Check thermostat and replace if necessary.
Temperature gauge or sensor defective	* Check temperature with thermometer and replace if necessary.
Overload running	* Reduce load.
Head gasket defective or water leakage	* Replace parts.
Incorrect injection timing	* Adjust to proper timing.
Unsuitable fuel used	* Use the specified fuel.

SPECIFICATIONS

Model		D905-E		D1005-E		D1105-E
Type	Vertical, water-cooled, 4-cycle diesel engine					
Number of cylinders	3					
Bore and atroke	mm (in.)	72×73.6 (2.83×2.90)		76×73.6 (2.99×2.90)		78×78.4 (3.07×3.09)
Total displacement	cm ³ (cu. in)	898 (54.80)		1001 (61.08)		1123 (68.53)
Combustion chamber	Spherical Type (E-TVCS)					
SAE NET Intermittent H.P. (SAEJ1349)	kW/min ⁻¹ (rpm) (HP/min ⁻¹ (rpm))	14.9/3000 (20.0/3000)	17.5/3600 (23.5/3600)	16.8/3000 (22.5/3000)	19.4/3600 (26.0/3600)	18.7/3000 (25.0/3000)
SAE NET Continuous H.P. (SAEJ1349)	kW/min ⁻¹ (rpm) (HP/min ⁻¹ (rpm))	12.7/3000 (17.0/3999)	15.3/3600 (20.5/3600)	14.2/3000 (19.0/3000)	16.8/3600 (22.5/3600)	16.4/3000 (22.0/3000)
Maximum bare speed	min ⁻¹ (rpm)	3200	3800	3200	3800	3200
Minimum bare idling speed	min ⁻¹ (rpm)	350~950				
Order of firing	1-2-3					
Direction of rotation	Counter-clockwise (viewed from flywheel side)					
Injection pump	Bosch MD Type Mini Pump					
Injection pressure	13.73 MPa (140kgf/cm ² , 1991 psi)					
Injection timing (Before T.D.C.)		19°	22°	19°	22°	19°
Compression ratio	23 : 1					
Fuel	Diesel Fuel No.2-D (ASTM D975)					
Lubricant (API classification)	above CD grade					
Dimensions (length×width×height)	mm (in.)	497.8×396×608.7 (19.60×15.59×23.96)				
Dry weight	kg (lbs.)	93 (205.0)				
Starting system	Cell starter (with glow plug)					
Starting motor	12 V, 1,0 kW					
Chargine generator	12V, 360 W					
Recommended battery capacity	12V, 65 AH, equivalent					

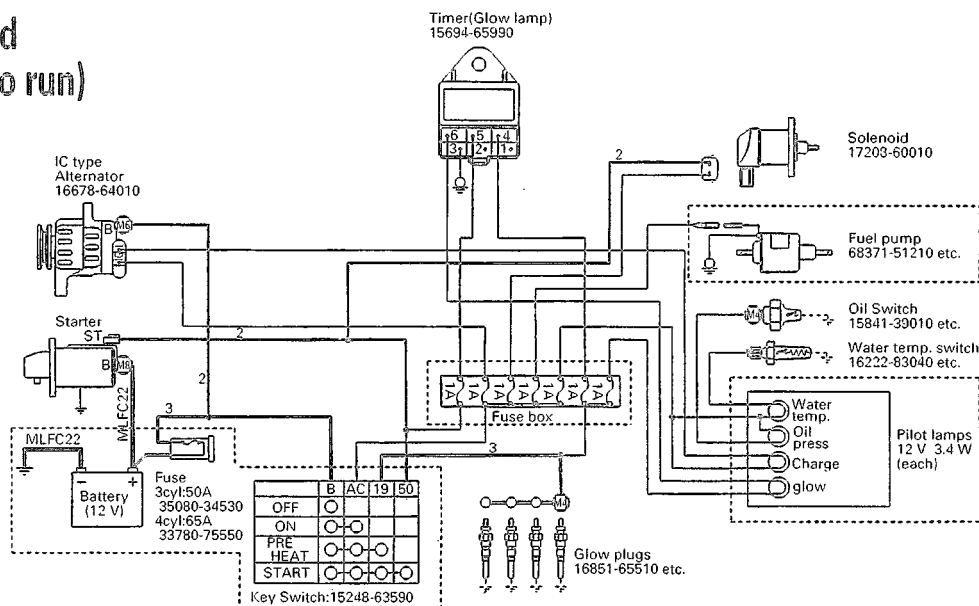
NOTE:

- Specifications are subject to change without notice.

V1205-E		V1205-TE		V1305-E		V1505-E		V1505-TE	
Vertical, water-cooled, 4-cycle diesel engine									
4									
72×73.6 (2.83×2.90)				76×73.6 (2.99×2.90)		74×78.4 (3.07×3.09)			
1198 (73.11)				1335 (81.47)		1498 (91.41)			
Spherical Type (E-TVCS)									
20.1/3000 (27.0/3000)	23.5/3600 (31.5/3600)	25.4/3000 (34.0/3000)	29.8/3600 (40.0/3600)	22.4/3000 (30.0/3000)	25.7/3600 (34.5/3600)	25.0/3000 (33.5/3000)		31.3/3000 (42.0/3000)	
17.2/3000 (23.0/3000)	20.1/3600 (27.0/3600)	21.6/3000 (29.0/3000)	25.7/3600 (34.5/3600)	19.0/3000 (25.5/3000)	22.4/3600 (30.0/3600)	21.6/3000 (29.0/3000)		27.2/3000 (36.5/3000)	
3200	3800	3200	3800	3200	3800	3200			
800~900									
1-3-4-2									
Counter-clockwise (viewed from flywheel side)									
Bosch MD Type Mini Pump									
13,73 MPa (140kgf/cm ² , 1991 psi)									
19°	22°	19°	22°	19°	22°	19°			
23 : 1		22.5 : 1		23 : 1			22.5 : 1		
Diesel Fuel No.2-D (ASTM D975)									
above CD grade									
583.8×396×613.7 (22.98×15.59×24.16)		591.3×439.2×613.7 (23.28×17.29×24.16)		583.8×396×613.7 (22.98×15.59×24.16)		591.3×396×613.7 (23.28×15.59×24.16)		591.3×439.2×631.3 (23.18×17.29×24.16)	
110 (242.5)		114 (251.3)		110 (242.5)			114 (251.3)		
Cell starter (with glow plug)									
12 V, 1.2 kW									
12V, 360 W									
12V, 70AH, equivalent									

WIRING DIAGRAMS

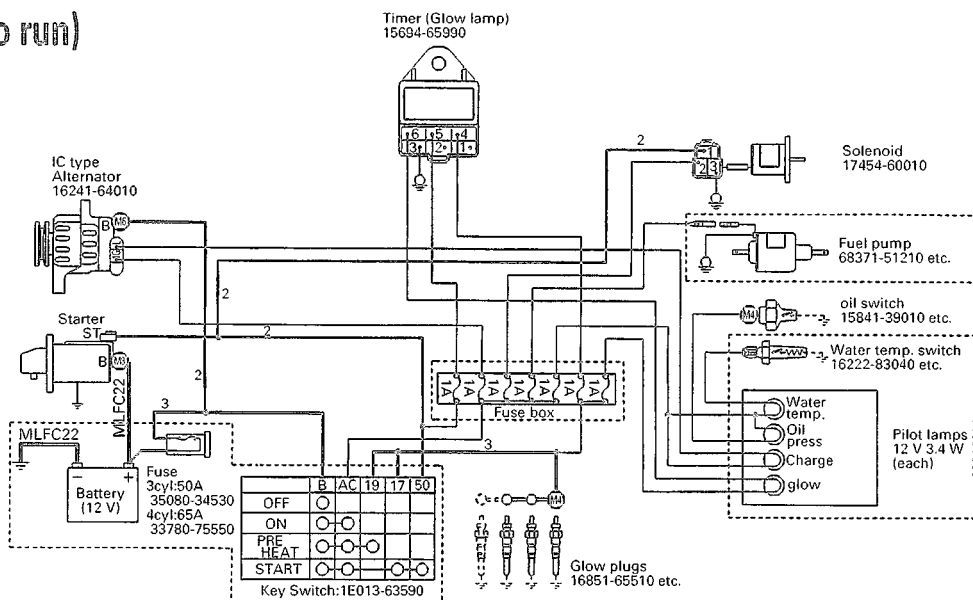
EC standard (Energize to run)



★ The parts boxed in [] are reference, NOT equipped for standard engine spec.

★ Non marked wire dia. is 0.8~1.25 mm².

KTC/SAE standard (Energize to run)



★ The parts boxed in [] are reference, NOT equipped for standard engine spec.

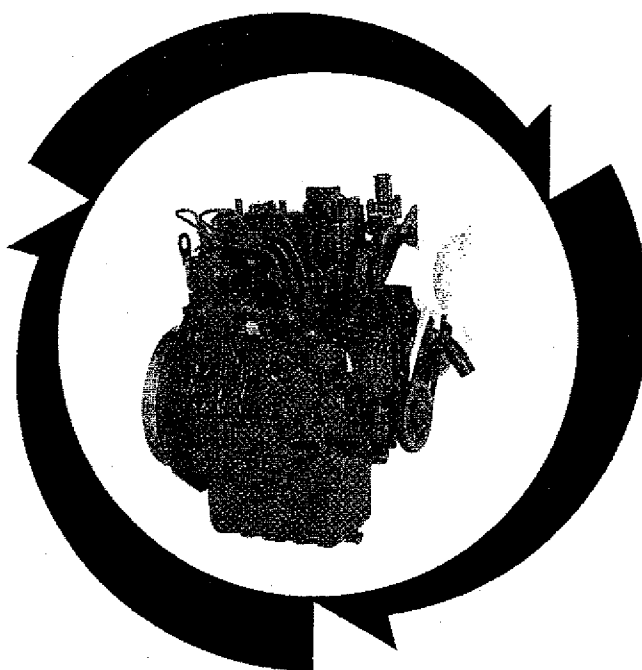
★ Non marked wire dia. is 0.8~1.25 mm².

ILLUSTRATED PARTS LIST
LISTE DES PIÉCES
STÜCK LISTE

KUBOTA

MODEL
MODELE **D1105-E2B-EU-XL1**
MODELL

DIESEL ENGINE
MOTEUR DIESEL
DIESEL MOTOREN



Kubota

97898-61870
JAN.
JANVIER 2004
JAN.

NOTICE

This Parts List is for the following purposes.

1. When ordering parts, check with this Parts List to confirm the part number and the name of parts.
2. When making repairs, refer to the illustrations in this Parts List.
3. This Parts List is subject to change without notice.

NOTE

Utilisation de ce livre

1. A la commande d'une pièce, chercher la référence et le nom de la pièce.
2. Pour les réparations, employez les illustrations.
3. La liste des pièces peut-être modifiée sans préavis.

ACHTUNG

Die vorliegende Stückliste ist zur Verwendung der folgenden Fälle aufzubewahren:

1. Bei Bestellung der Teile anhand dieser Liste die Kennzahl und die Bezeichnung der Teile feststellen.
2. Bei Reparatur auf die Figur in der Stückliste Bezug nehmen.
3. Änderungen dieser Bestandteilliste vorbehalten.

MODEL MODELE MODELL	CODE No. No. DE CODE CODE-Nr.
D1105-E2B-EU-XL1	1G905-21000

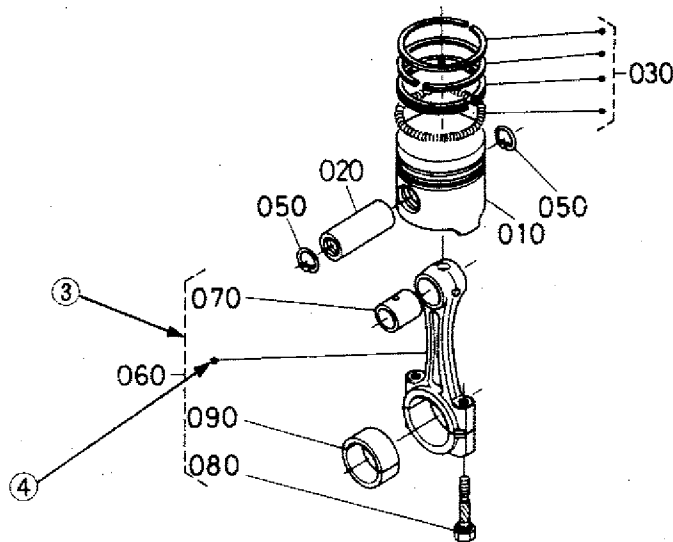
INSTRUCTIONS
INSTRUCTION
ERKLÄRUNG

①
↓
0102 PISTON AND CRANKSHAFT
PISTON ET VILEBREQUIN
KOLBEN UND KURBELWELLE

⑩ → S.No. ; A: ≤ 15000 , B: 14000 to 15000

⑪
↓
[B]

②
↓
B02-R



5	6	7	8	6	9		
				A:XXXX, B:XXXX			
REF. No. POS.No. BILD-Nr.	PART No. REFERENCE BESTELL-Nr.	PART NAME	DESIGNATION	BEZEICHNUNG	QTY./S.No. QTE./No.S. STUECK/S.Nr.	I.C.	REMARKS REMARQUES BEMERKUNGEN
					A B		
010	15800-0000-0	PISTON	PISTON	KOLBEN	1 ~15000	1 ~15000	[Example-1]
010	15800-0000-2	PISTON	PISTON	KOLBEN	1 15001~	1 15001~	[Exemple-1]
020	15800-1000-0	PIN,PISTON	AXE DE PISTON	KOLBENBOLZEN	1 ~15000	1 ~15000	[Beispiel-1]
020	15800-1000-2	PIN,PISTON	AXE DE PISTON	KOLBENBOLZEN	1 15001~	1 15001~	[Example-2]
030	15800-2000-0	ASSY PISTON RING	ENS.JEU DE SEGMENTS	KOLBENRINGE	1 ~15000	1 ~15000	[Exemple-2]
030	15830-2000-0	ASSY PISTON RING	ENS.JEU DE SEGMENTS	KOLBENRINGE	1 15001~	1 15001~	[Beispiel-2]
							[Example-3]
							[Exemple-3]
							[Beispiel-3]

- ① No. de Fig Représente le No. de chaque nom de groupe.
- ② No.d'emplacement ... Représente le substitut du numérotage de page ordinaire. Les pages du côté gauche de la liste des pièces détachées sont numérotées en **XXX-L**.
Celles du côté droit sont numérotées en **XXX-R**. Les No. d'emplacement sont également utilisés dans l'index numérique à la fin de la liste des pièces détachées.
- ③ Composantes Les composantes d'un ensemble sont identifiées par des parenthèses en pointillé.
- ④ Point Indique que la pièce n'est pas à vendre toute seule.
Elle doit être commandée avec l'ensemble (POS.No. 060) qui la contient.
- ⑤ POS.No. Des numéros de position sont donnés aux pièces représentées dans l'illustration.
Le référence d'une pièce de l'illustration peut être identifié en se reportant au même numéro de position indiqué dans la liste des pièces détachées.
- ⑥ Nom de type Le nom du type de base est indiqué dans cette colonne. Les autres modèles sont indiqués dans la colonne des "REMARQUES" ⑨.
- ⑦ No. S. Indique un groupe de numéros de série qui a subi des modifications de modèle.
(No. de série)
- ⑧ I. C. Indique la permutabilité des pièces due à un changement dans le modèle.
(permutabilité)
- Exemple-1 ☐ indique que la nouvelle pièce peut remplacer la vieille, mais pas vice versa.
Le 15800-0000-0 s'applique au premier numéro de série jusqu'au No.S. 15000.
Le 15800-0000-2 s'applique au premier numéro de série et à ceux ci-dessus.
- Exemple-2 ☒ indique que la nouvelle et vieille pièces sont permutables.
Le 15800-1000-0 s'applique au premier numéro de série jusqu'au No.S. 15000.
Le 15800-1000-2 s'applique au No.S. 15001 et à ceuxci-dessus.
- Exemple-3 ☐ indique que la nouvelle piése et la vieille pièce sont interchangeable. Toutes deux numéros 15800-2000-0 et 15830-2000-0 sont applicables a premier numéro de cette depuis.
- ⑨ REMARQUES 1 ... Cette colonne renferme d'autres noms de modèles applicables, les dimensions et autres éléments spéciaux.
Les symboles abréviations suivants sont utilisés dans l'ensemble de ce manuel.
29*12.00-15 Dimension des pneus
sq.m m² sq.mm mm²
cu.m m³ cu.mm mm³
D Diamètre L Longueur
- ⑩ REMARQUES 2 ... Les expressions suivantes sont utilisées dans la NOTE de chaque groupe.
Les numéros de série des machines sont indiqués de la manière suivante.
<=15000 Numéros de série au-dessous de 15000.
>=15001 Numéros de série au-dessus de 15001.
14000 to 15000 Numéros de série 14000 à 15000.
Pour certaines modèles, les expressions ci-dessus peuvent aussi être utilisées dans la rubrique des REMARQUES 1 ⑨.
- ⑪ Spécifications Les types et les destinations des modèles soeurs sont indiqués. Ces indications
(pour modèles soeurs) sont données pour donner leurs pages relatives dans ce livre.

- ① Fig. No. Represents No. corresponding to each group name.
 - ② L. No. Substitute for conventional page numbering. Left-hand pages of the parts list are
(location No.) numbered in **XXX-L**, and the right-hand pages in **XXX-R**.
The location No. are also used in numerical index at the end of parts list.
 - ③ Components The components of an assembly are identified by a bracket of dotted lines.
 - ④ Point Indicates that the parts is not sold independently.
The assembly (Ref.No.060) containing the part needs to be ordered.
 - ⑤ REF. No. Reference numbers are assigned to parts in the illustration. The code number of a part in the illustration can be identified by referring to the same reference number in the parts list.
 - ⑥ Model name The name of the basic model is indicated in this column. Other applicable models are indicated on the "REMARKS" column ⑨.
 - ⑦ S. No. Indicates a group of serial numbers to which a design change is applied.
(serial No.)
 - ⑧ I. C. Indicates the interchangeability of parts due to design change.
(interchangeability)
- Example-1 ☐ indicates that a new part can replace an old part, but not vice versa.
15800-0000-0 is applicable to the first serial number to S. No. 15000.
15800-0000-2 is applicable to the first serial number and above.
- Example-2 ☒ indicates that the new and old parts are not interchangeable.
15800-1000-0 is applicable to the first serial number to S. No. 15000.
15800-1000-2 is applicable to S. No. 15001 and above.
- Example-3 ☐ indicates that the new and old parts are interchangeable.
Both 15800-2000-0 and 15830-2000-0 are applicable to the first serial number and above.
- ⑨ REMARKS 1 In this column, enter other applicable model names, dimensions and other special items.
The following symbols and abbreviations are used throughout this book.
29*12.00-15 Tire size
sq.m m² sq.mm mm²
cu.m m³ cu.mm mm³
D Diameter L Length
 - ⑩ REMARKS 2 The following expressions are used in NOTE for each group.
Machines' serial numbers are indicated as follows.
<=15000 Serial number below 15000.
>=15001 Serial number above 15001.
14000 to 15000 Serial number 14000 to 15000.
For some models, the above expressions may also be used REMARKS 1 ⑨.
 - ⑪ Specifications The types and destinations of sister models are indicated. These indications are
(for sister models) given to tell their relevant pages in this book.

- ① Abb. Nr. Diese Nummer bezieht sich auf die jeweilige Gruppenbezeichnung.
- ② Such-Nr. Diese Nummer ersetzt die Seitenzahl. Die linken Seiten der Ersatzteilliste tragen die Nummern **XXX-L**, die rechten Seiten die Nummern **XXX-R**.
Die Such-Nr. wird ebenfalls im numerischen Index am Ende der Ersatzteilliste aufgeführt.
- ③ Einzelteile Die Einzelteile einer Baugruppe sind durch eine Klammer aus gestrichelten Linien gekennzeichnet.
- ④ Punkte Punktierung zeigt an, daß das entsprechende Teil nicht einzeln erhältlich ist. Die gesamte Baugruppe, die dieses Teil beinhaltet muß bestellt werden. (BILD-Nr. 060).
- ⑤ BILD-Nr. Die Teile in den Abbildungen sind mit Bezugsnummern versehen. Die Kennnummer eines der abgebildeten Teile erhalten Sie, wenn Sie unter der Bezugsnummer in der Ersatzteilliste nachsehen.
- ⑥ Typenbezeichnung ... In dieser Spalte wird die Bezeichnung des Grundtype aufgeführt. Weiter Modelle, die verwendet werden können werden unter "BEMERKUNGEN" in Spalte ⑨ angegeben.
- ⑦ S. Nr. Bezeichnet eine Gruppe Seriennummern, bei der Änderungen in der Ausführung (Serien Nr.) vorgenommen wurden.
- ⑧ I. C. Bezeichnet die Austauschmöglichkeit der Teile untereinander bei einer Änderung in der Ausführung. (Austauschmöglichkeit)

Beispiel-1 ☐ besagt, daß das alte Teil durch ein neues ersetzt werden kann, nicht jedoch umgekehrt. 15800-0000-0 bezieht sich auf die erste Serien Nr. bis S.Nr. 15000.
15800-0000-2 bezieht sich auf die erste Serien Nr. und darüber.

Beispiel-2 ☒ besagt, daß alte und neue Teile nicht austauschbar sind.
15800-1000-0 bezieht sich auf die erste Serien Nr. bis S.Nr. 15000.
15800-1000-2 bezieht sich auf S.Nr. 15001 und darüber.

Beispiel-3 ☐ besagt, daß alte und neue Teile austauschbar sind.
Beiderseitig 15800-2000-0 und 15830-2000-0 bezieht sich auf die erste Serien Nr. und darüber.
- ⑨ BEMERKUNGEN 1 ... In dieser Spalte finden Sie weitere verwendbare Modellbezeichnungen, Abmessungen und andere besondere Angaben.
Die folgenden Symbole und Abkürzungen werden im Gesamtext des Buches benutzt :

29*12.00-15 Reifengrößen
sq.m m² sq.mm mm²
cu.m m³ cu.mm mm³
D Durchmesser L Länge
- ⑩ BEMERKUNGEN 2 ... Die folgenden Ausdrücke werden in "NOTE" für jede Gruppe verwendet.
Seriennummern von Maschinen werden wie folgt angezeigt :

<=15000 ... Seriennummern unter 15000.
>= Seriennummern über 15001.
14000 bis 15000 Seriennummern 14000 bis 15000.

Bei einigen Modellen können die oben genannten Ausdrücke auch in "ANMERKUNGEN 1 ⑨" verwendet werden.
- ⑪ Spezifikationen Die Typen und Bestimmungsorte der Schwestermodelle sind angegeben. Die (für Schwestermodelle) Angaben beziehen sich auf die entsprechenden Seiten in diesen Handbuch.

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INHALTSVERZEICHNIS

[D1105-E2B-EU-XL1]

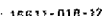
0001	KURBELGEHAEUSE	1
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**CRANKCASE
BLOC MOTEUR
KURBELGEHÄUSE**

[illegible]

1

OIL PAN
CARTER D' HUILE
OELWANNE

[illegible]

2

CYLINDER HEAD
CULASSE
ZYLINDERKOPF

[illegible]

3

GEAR CASE
CARTER DE DISTRIBUTION
GETRIEBEGEHAUSE

[illegible]

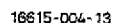
4

HEAD COVER
COUVRE-CULASSE
ZYLINDERKOPF-DECKEL

[illegible]

5

**DIPSTICK AND GUIDE
JAUGE D'HUILE ET GUIDE
OELMESSSTAB UND FUEHRUNG**

[illegible]

7

MAIN BEARING CASE
PALIERS DE VILEBREQUIN
HAUPTLAGERGEHAEUSE



A:D1105-E2B-EU-XL1

↔ interchangeable; ≠ not interchangeable; ← new for old; → old for new

CAMSHAFT AND IDLE GEAR SHAFT
ARBRE A CAMES ET ARBRE DE PIGNON DE RALENTI
NOCKENWELLE UND FREILAUFGETRIEBEWELLE

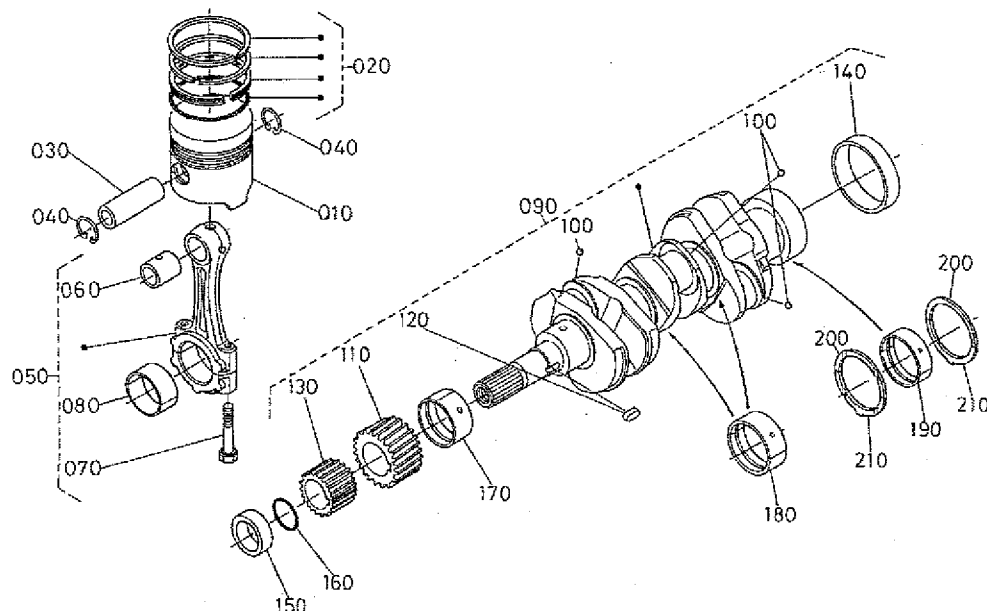


Public

↔ Interchangeable; ≠ not interchangeable; ← new for old; → old for new

0102

PISTON AND CRANKSHAFT
PISTON ET VILEBREQUIN
KOLBEN UND KURBELWELLE



A:D1105-E2B-EU-XL1

REF. No. POS. No. BILD-Nr.	PART No. REFERENCE BESELL-Nr.	PART NAME	DESIGNATION	BEZEICHNUNG	Q'TY/S. No. Q'TE/No. S. STUECK/S. Nr.		I. C.	REMARKS REMARQUES BEMERKUNGEN
					A	B		
010	16060-2111-0	PISTON	PISTON	KOLBEN	3	-		STD
010	16060-2191-0	PISTON	PISTON	KOLBEN	3	-		+0.50mm
020	16261-2105-0	ASSY PISTON RING	ENS. SEGMENT	GRP. KOLBENRING	3	-		STD
020	16261-2109-0	ASSY PISTON RING	ENS. SEGMENT	GRP. KOLBENRING	3	-		+0.50mm
030	16241-2131-0	PIN, PISTON	AXE DE PISTON	KOLBENBOLZEN	3	-		
040	16241-2133-0	GIR CLIP, PISTON PIN	CIRCLIP	SEEGERING	6	-		
050	16241-2201-2	ASSY ROD, CONNECTING	ENS. BIELLE	TRIEBSTANGE KOMP	3	-		
060	16241-2198-2	BUSH, PISTON PIN	BAGUE DE BIELLE	BUCHSE, KOLBENSTIFT	3	-		
070	16241-2214-2	BOLT, CONNECTING ROD	VIS DE BIELLE	BOLZEN	6	-		
080	16241-2231-0	METAL, CRANKPIN	COUSSINET DE BIELLE	METALLTEIL	3	-		STD SET
080	16241-2297-0	METAL, CRANKPIN	COUSSINET DE BIELLE	METALLTEIL	3	-		-0.20mm SET
080	16241-2298-0	METAL, CRANKPIN	COUSSINET DE BIELLE	METALLTEIL	3	-		-0.40mm SET
090	16265-2301-3	COMP. CRANKSHAFT	VILEBREQUIN COMPLET	KOMP. KURBELWELLE	1	-		
100	07715-00401	BALL	BILLE	KUGEL	3	-		
110	16241-2411-0	GEAR, CRANK	PIGNON	ZAHNRAD	1	-		
120	16271-9523-0	KEY	CLAVETTE	KEIL	1	-		
130	16241-3563-0	GEAR, OIL PUMP DRIVE	PIGNON ENTRAIN. POMPE	GETRIEBE	1	-		
140	16241-2328-0	SLEEVE, CRANKSHAFT	FRETTE ARRIERE	MUFFE	1	-		
150	16241-2325-0	COLLAR, CRANKSHAFT	COLLIER VILEBREQUIN	HALSRING	1	-		
160	04814-10280	O RING	JOINT TORIQUE	O RING	1	-		
170	16241-2347-0	METAL, CRANKSHAFT	COUSSINET DE VILEBR.	METALLTEIL	1	-		STD
170	16241-2391-0	METAL, CRANKSHAFT	COUSSINET DE VILEBR.	METALLTEIL	1	-		-0.20mm
170	16241-2392-0	METAL, CRANKSHAFT	COUSSINET DE VILEBR.	METALLTEIL	1	-		-0.40mm
180	16241-2348-0	METAL, CRANKSHAFT	COUSSINET DE VILEBR.	METALLTEIL	2	-		STD SET
180	16241-2393-0	METAL, CRANKSHAFT	COUSSINET DE VILEBR.	METALLTEIL	2	-		-0.20mm SET
180	16241-2394-0	METAL, CRANKSHAFT	COUSSINET DE VILEBR.	METALLTEIL	2	-		-0.40mm SET
190	16292-2349-0	METAL, CRANKSHAFT	COUSSINET DE VILEBR.	METALLTEIL	1	-		STD SET
190	16292-2386-0	METAL, CRANKSHAFT	COUSSINET DE VILEBR.	METALLTEIL	1	-		-0.20mm SET
190	16292-2387-0	METAL, CRANKSHAFT	COUSSINET DE VILEBR.	METALLTEIL	1	-		-0.40mm SET
200	15521-2353-0	METAL, SIDE	COUSSINET DE LATERAL	METALLSEITENRING	2	-		STD

↔ interchangeable; ≠ not interchangeable; ← new for old; → old for new

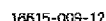
**PISTON AND CRANKSHAFT
PISTON ET VILEBREQUIN
KOLBEN UND KURBELWELLE**



16

↔ interchangeable; ≠ not interchangeable; ← new for old; → old for new

**FLYWHEEL
VOLANT MOTEUR
SCHWUNGRAD**

[illegible]

↔ Interchangeable; ≠ not interchangeable; ← new for old; → old for new

FUEL CAMSHAFT AND GOVERNOR SHAFT
ARBRE A GAMES DE CARBURANT ET ARBRE REGULATEUR
KRAFTSTOFF-NOCKENWELLE UND ACHSE



11.

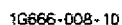
↔ interchangeable; ≠ not interchangeable; ← new for old; → old for new

**IDLE APPARATUS
DISPOSITIF DE RALENTISSEUR
FREILAUFAPPARAT**

[illegible]

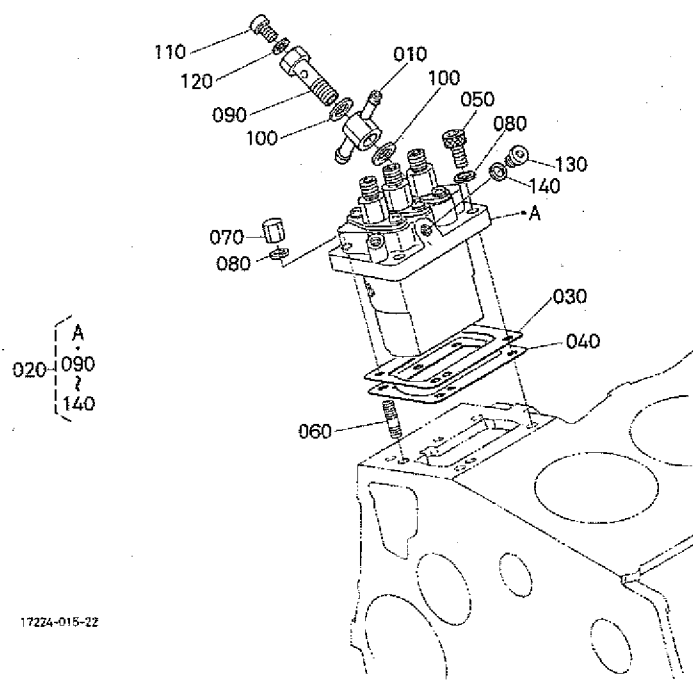
14

STOP SOLENOID
SOLENOIDE D'ARRET
ABSTELLSOLENOID

[illegible]

15

**INJECTION PUMP
POMPE D'INJECTION
EINSPRITZENPUMPE**



17274-015-22

[illegible]

↔ Interchangeable; ≠ not interchangeable; ← new for old; → old for new

**GOVERNOR
REGULATEUR DE VITESSES
REGLER**

[illegible]

↔ interchangeable; ≠ not interchangeable; ← new for old; → old for new

**SPEED CONTROL PLATE
PLAQUE DE VITESSE-CONTROLE
GESCHWINDIGKEITS-REGLERPLATTE**

[illegible]

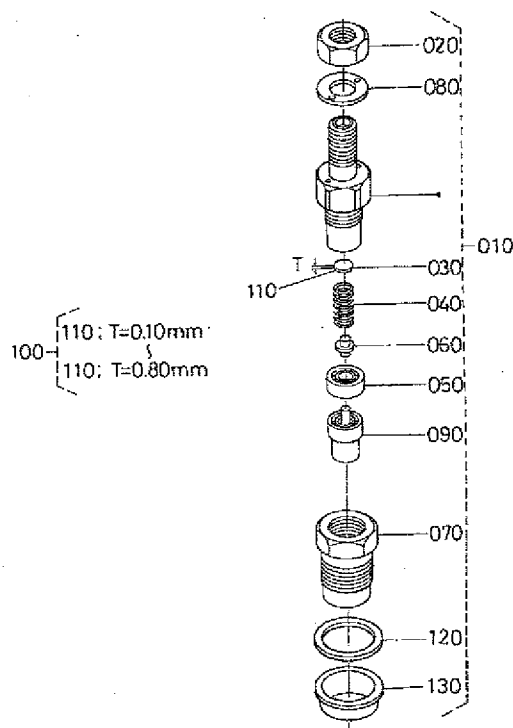
18

NOZZLE HOLDER AND GLOW PLUG
PORTE-INJECTEUR ET BOUGIE DE PRECHAUFFAGE
DUESENHALTER UND GLUEHKERZE

[illegible]

19

NOZZLE HOLDER (COMPONENT PARTS)
PORTE-INJECTEUR (PARTIES COMPOSANTES)
DÜSENHALTER (EINZEL-TEIL)



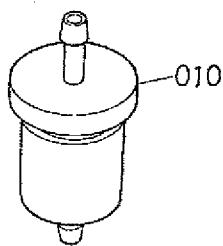
16347-015-10

A:D1105-E2B-EU-XL1

[illegible]

↔ Interchangeable; ≠ not interchangeable; ← new for old; → old for new

**FUEL FILTER
FILTRE A CARBURANT
KRAFTSTOFFFILTER**



A:D1105-E2B-EU-XL1

[illegible]

↔ Interchangeable; ≠ not interchangeable; ← new for old; → old for new

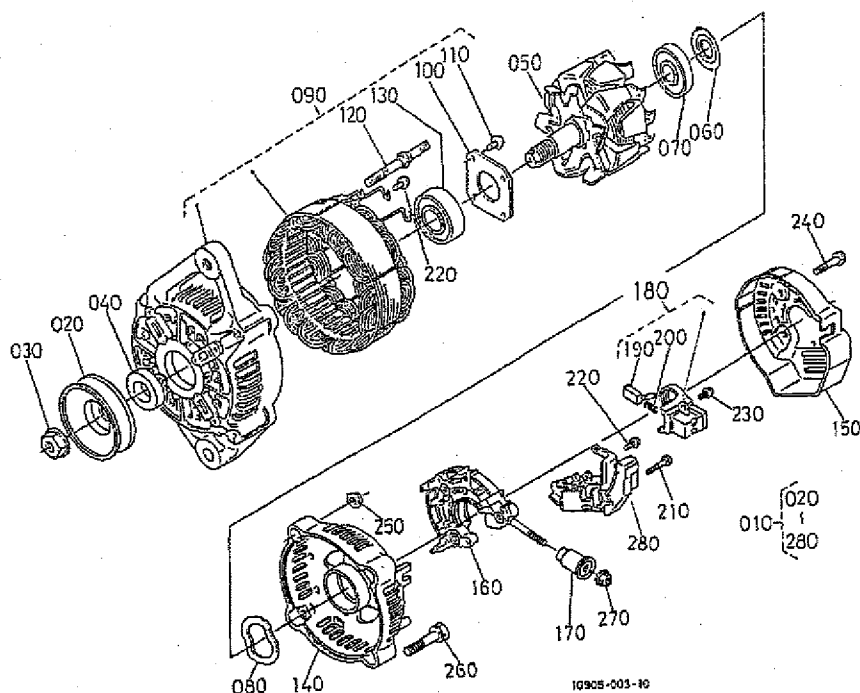
**ALTERNATOR AND PULLEY
ALTERNATEUR
WECHSELSTROMMASCHINE**

[illegible]

23

0403

ALTERNATOR (COMPONENT PARTS)
ALTERNATEUR (PARTIES COMPOSANTES)
WECHSELSTROMMASCHINE (EINZEL-TEIL)

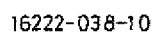


A:D1105-E2B-EU-XL1

REF. No. POS. No. BILD-Nr.	PART No. REFERENCE BESELL-Nr.	PART NAME	DESIGNATION	BEZEICHNUNG	Q'TY/S. No. Q'TE/No. S. STUECK/S. Nr.		I. C.	REMARKS REMARQUES BEMERKUNGEN
					A	B		
010	16678-6401-2	ASSY ALTERNATOR	ALTERNATEUR COMPLET	GRP. WECHSELSTROMDYN.	1	-		
020	15881-6411-0	PULLEY, DYNAMO	POULIE D'ALTERNATEUR	RIEMENSCHLEIBE, DYNAMO	1	-		
030	15881-9201-0	NUT	ECROU	MUTTER	1	-		
040	15881-6415-0	COLLAR	COLLIER	HUELSE	1	-		
050	66436-6404-0	ROTOR	ROTOR	ROTOR	1	-		
060	15881-6480-0	COVER, BEARING	COUVERCLE	DECKEL	1	-		
070	16652-6477-0	BEARING, BALL	ROULEMENT A BILLES	KUGELLAGER	1	-		
080	15881-6481-0	WASHER, THRUST	RONDELLE DE BUTEE	DRUCKSCHEIBE	1	-		
090	66436-6402-0	ASSY FRAME, DRIVE END	ENS. BATI ARRIERE	GRP. ANTRIEBSRAHMEN	1	-		
100	15881-6471-0	PLATE, RETAINER	PLAQUE RETENUE	HALTEPLATTE	1	-		
110	15881-9301-0	SCREW, ROUND HEAD	VIS A TETE RONDE	RUNDKOPFSCHRAUBE	4	-		
120	15881-6426-0	BOLT, THROUGH	VIS, PASSANT	DURCHGEHENDERBOLZEN	2	-		
130	16652-6478-0	BEARING, BALL	ROULEMENT A BILLES	KUGELLAGER	1	-		
140	16678-6406-0	FRAME, END	BATI	RAHMEN	1	-		
150	16678-6423-0	COVER, END	PALIER ARRIERE	DECKEL	1	-		
160	15881-6485-0	ASSY RECTIFIER	REDRESSEUR	MONT. GLEICHRICHTER	1	-		
170	15881-6490-0	BUSH, INSULATION	BAGUE ISOLANTE	BUCHSE	1	-		
180	16652-6431-0	HOLDER, BRUSH	PORTE-BALAI	BUERSTEN HALTER	1	-		
190	15881-6409-0	BRUSH	PATTE D'ATTACHE	BUERSTE	2	-		
200	15881-6433-0	SPRING, BRUSH	RESSORT DE BALAI	SCHLEIFBUERSTENFEDER	2	-		
210	15881-9302-0	SCREW, ROUND HEAD	VIS A TETE RONDE	RUNDKOPFSCHRAUBE	2	-		
220	15881-9303-0	SCREW, ROUND HEAD	VIS A TETE RONDE	RUNDKOPFSCHRAUBE	6	-		
230	15881-9304-0	SCREW, ROUND HEAD	VIS A TETE RONDE	RUNDKOPFSCHRAUBE	1	-		
240	15881-9104-0	BOLT	VIS	BOLZEN	3	-		
250	15881-9202-0	NUT	ECROU	MUTTER	2	-		
260	15881-9105-0	BOLT	VIS	BOLZEN	2	-		
270	14182-9203-0	NUT	ECROU	MUTTER	1	-		
280	16652-6460-0	ASSY REGULATOR	REGULATEUR	REGULATOR	1	-		

↔ interchangeable; ≠ not interchangeable; ← new for old; → old for new

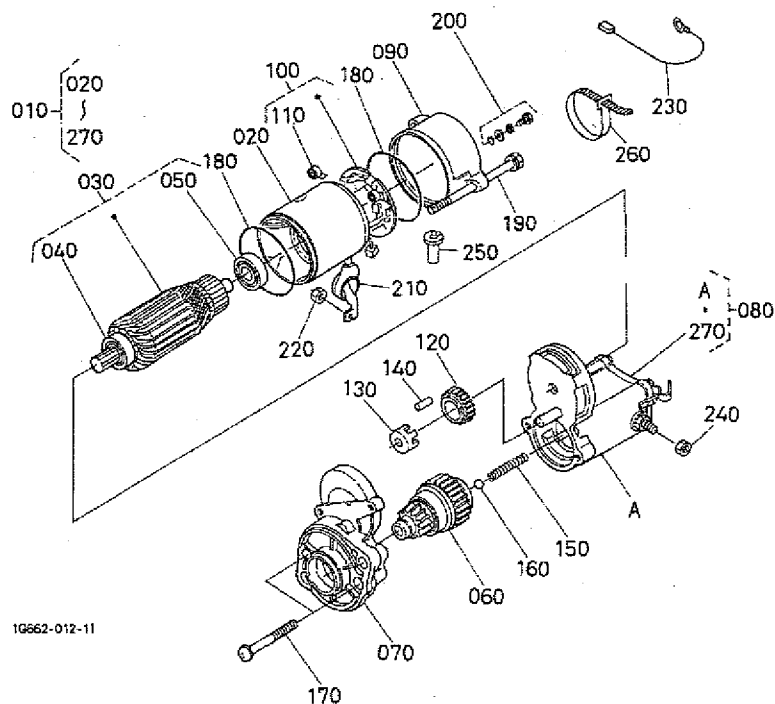
**STARTER
DEMARREUR
ANLASSER**

[illegible]

↔ Interchangeable; ≠ not interchangeable; ← new for old; → old for new

0405

STARTER (COMPONENT PARTS)
 DEMARREUR (PARTIES COMPOSANTES)
 ANLASSER (EINZEL-TEIL)



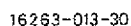
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A:D1105-E2B-EU-XL1

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					A	B		
010	16235-6301-0	ASSY STARTER	ENS. DEMARREUR	GRP. ANLASSER	1	-		
020	16661-6308-0	ASSY YOKE	ENS. CHAPE	GRP. GABELGELENK	1	-		
030	11197-6307-0	ASSY ARMATURE	ENS. ARMATURE	GRP. ARMATUR	1	-		
040	11460-6350-0	BEARING	ROULEMENT	LAGER	1	-		
050	11460-6353-0	BEARING	ROULEMENT	LAGER	1	-		
060	16235-6304-0	KIT, STARTER	BORNE ET PLONGEUR	ANLASSER, ZUSAMMENBAU	1	-		
070	16235-6303-0	ASSY HOUSING, STARTER	ENS. CARTER DEMARREUR	GRP. GEHAUSE	1	-		
080	16611-6302-0	ASSY SWITCH, MAGNETIC	SOLENOIDE	GRP. MAGNETSCHALTER	1	-		
090	17341-6320-0	FRAME, END	BATI	RAHMEN	1	-		
100	11197-6338-0	ASSY HOLDER, BRUSH	ENS. SUPPORT	GRP. BUERSTENHALTER	1	-		
110	15401-6339-0	SPRING, BRUSH	RESSORT DE BALAI	SCHLEIFBUERSTENFEDER	4	-		
120	11460-6327-0	GEAR	ENGRENAGE	GETRIEBE	1	-		
130	11460-6311-0	RETAINER	SUPPORT	HALTESCHEIBE	1	-		
140	19212-6310-0	ROLLER	ROULEAU	ROLLE	5	-		
150	11460-6312-0	SPRING	RESSORT	FEDER	1	-		
160	19212-9713-0	BALL	BILLE	KUGEL	1	-		
170	11460-9331-0	BOLT	VIS	BOLZEN	2	-		
180	15511-9666-0	O RING	JOINT TORIQUE	O RING	2	-		
190	11197-6332-0	BOLT	VIS	BOLZEN	2	-		
200	15511-6376-0	ASSY BOLT	ENS. VIS	GRP. BOLZEN	2	-		
210	16611-6345-0	COVER	COUVERCLE	DECKEL	1	-		
220	13963-9201-0	NUT, HEXAGON	ECROU HEXAGONAL	MUTTER	1	-		
230	16611-6366-0	CORD, STOP SOLENOID	PRISE DE SOLENOIDE	CABLESTOPSOLENOID	1	-		
240	16285-9201-0	NUT, HEXAGON	ECROU HEXAGONAL	MUTTER	1	-		
250	16285-6357-0	PIPE, DRAIN	TUYAU DE DRAINAGE	DRANLEITUNG	1	-		
260	16612-6310-0	BAND, COVER	BANDE, COUVERCLE	FLACHRIEMEN	1	-		
270	16285-9805-0	ASSY COVER	ENS. COUVERCLE	GRP. DECKEL	1	-		

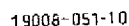
↔ interchangeable; ≠ not interchangeable; ← new for old; → old for new

OIL SWITCH AND PLUG
CONTACT A HUILE ET OBTURATEUR
OELSCHALTER UND VERSCHLUSSSTOPFEN

[illegible]

27

**WATER FLANGE AND THERMOSTAT
BRIDE A EAU ET THERMOSTAT
WASSERFLANSCH UND THERMOSTAT**

[illegible]

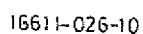
28

**WATER PUMP
POMPE A EAU
WASSERPUMPE**

[illegible]

29

FAN
VENTILATEUR
VENTILATOR

[illegible]

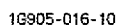
31

**VALVE AND ROCKER ARM
SOUPAPES ET CULBUTEURS
VENTIL UND KIPPENARM**

[illegible]

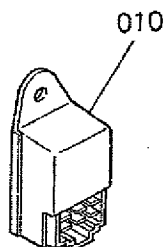
32

**INLET MANIFOLD
COLLECTEUR D'ADMISSION
ANSAUGENLEITUNG**

[illegible]

↔ Interchangeable; ≠ not interchangeable; ← new for old; → old for new

GLOW LAMP AND TIMER
INDICATEUR DE PRECHAUFFAGE ET TEMPORISATEUR
GLUEHLAMPE UND ZEITMESSER

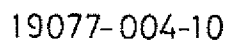


A:D1105-E2B-EU-XL1

[illegible]

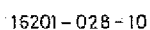
↔ interchangeable; ≠ not interchangeable; ← new for old; → old for new

ACCESSORIES AND SERVICE PARTS
ACCESSOIRES ET PIÉCES DE SERVICE
ZUBEHOER UND BEDIENTUNG-TEIL

[illegible]

↔ interchangeable; ≠ not interchangeable; ← new for old; → old for new

OPERATOR'S MANUAL
MANUEL DE L'UTILISATEUR
HANDHABUNG-GEBRAUCHSANWEISUNG

[illegible]

↔ Interchangeable; ≠ not interchangeable; ← new for old; → old for new

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